

**MODEL DEVELOPMENT FOR COMBINED
UNIVERSITY ADMISSION SYSTEM IN
RESPECT OF BANGLADESH**

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**BACHELOR OF SCIENCE IN INFORMATION
AND COMMUNICATION ENGINEERING
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for the award of the degree of
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DECLARATION

This thesis report is submitted to the Department of Information and Communication Engineering of Noakhali Science and Technology University in partial fulfillment of the requirement for having the B.Sc. in Information and Communication Engineering (ICE). So, I hereby declare that this thesis report has not been submitted elsewhere for the requirement of any kind of Degree, Diploma or Publication.

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ACCEPTANCE

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ABSTRACT

Education encompasses our lives and as the foundation of our society. Inefficient admission system reduces the number of efficient students in the university due to its speed, delay and harassment. The number of students seeking higher education in Bangladesh is increasing in a good rate every year. Student admissions are playing very important role in major activities of any university. The basic requirement of the university is students, without students university cannot survive. It affects the overall resources of the universities and its quality constraints. University admission process in Bangladesh is very complex, time-consuming and costly. There are many types of universities in Bangladesh. Admission process is different from one university to another university so suffering of candidates is very high. Some universities authority agrees to take integrated admission system and some authority is not interested to take integrated admission. There is no such admission model to solve this problem. So better admission process is necessary to solve this problem. This paper proposed some model for combined admission test. The focus of this paper is to identify those models, which can reduce the limitation of the traditional admission system and provide a quality admission process. For proposing model, we had gone through the different country admission process, technical papers of this field, find out necessary data from online and survey so that we can easily planning, analyzing, design, and testing. This paper presents three model that serves as the core design for a university admission recommender system.

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LIST OF ABBREVIATIONS

ATAR	Australian Tertiary Admissions Rank
ACER	Australian Council for Educational Research
ACT	American College Testing
BITSAT	Birla Institute of Technology and Science Aptitude Test
BITS	Birla Institute of Technology and Science
BRU	Begum Rokeya University
BAU	Bangladesh Agricultural University
BSMRAU	Bangabandhu Sheikh Mujibur Rahman Agricultural University
BU	University of Barisal
BSMRSTU	Bangabandhu Sheikh Mujibur Rahman Science and Technology University
BSMRMU	Bangabandhu Sheikh Mujibur Rahman Maritime University
BUTEXT	Bangladesh University of Textiles
BUET	Bangladesh University of Engineering & Technology
CUAS	Cluster-wise University Admission System
CSAG	Cluster System Admission Based on Group
CSAT	Cluster System Admission Based on Type of University
CLAT	Common Law Admission Test
CMAT	Common Management Admission Test
CSV	Comma-separated values
CAT	Common Admission Test
CU	University of Chittagong

CoU	Comilla University
CVASU	Chittagong Veterinary and Animal Sciences University
DU	University of Dhaka
HSTU	Hajee Mohammad Danesh Science & Technology University
IUAS	Integrated University Admission System
IU	Islamic University, Bangladesh
IAI	Independent Administrative Institution
JU	Jahangirnagar University
JEE	Joint Entrance Examination
JnU	Jagannath University
JKKNIU	Jatiya Kabi Kazi Nazrul Islam University
JUST	Jessore University of Science & Technology
KU	Khulna University
KUET	Khulna University of Engineering & Technology
MoE	Ministry of Education
MCQ	Multiple Choice Questions
NSTU	Noakhali Science and Technology University
NTA	National Testing Agency
NTA	National Testing Agency
NLUO	National Law University Odisha
NCUEE	National Center for University Entrance Examinations
PUST	Pabna University of Science and Technology
PSTU	Patuakhali Science and Technology University

RU	University of Rajshahi
RUB	Rabindra University Bangladesh
RUET	Rajshahi University of Engineering & Technology
RSTU	Rangamati Science and Technology University
STAT	Special Tertiary Admissions Test
SAU	Sher-e-Bangla Agricultural University
SAU	Sylhet Agricultural University
SUST	Shahjalal University of Science and Technology
UAC	Universities Admissions Centre
UCAS	University and Colleges Admissions Service
VIT	Vellore Institute of Technology
VITEEE	Vellore Institute of Technology Engineering Entrance Examination
XAT	Xavier Aptitude Test

CHAPTER 1

INTRODUCTION

1.1 Introduction

Quality based education is the right of every individual. Nowadays everywhere educational institutions have gathered momentum in large numbers. Higher learning takes the intellect to the next level, providing a deeper understanding of the world around us. A university education has become a basic part of most people's preparation for working life. Admission to university is therefore a topic of importance. How a student chooses a university, and conversely how a university chooses a student, determines the success of both sides in carrying through the education. Student admissions are a vital part of any university's running because students are what keep a University alive. The student admission is one of the most important activities within a university as one cannot survive without students. A poor admissions system can mean fewer students being admitted into a university because of mistakes or an overly slow response time and student also feel very nervous after getting admission in undesired university. At present the admission test system in country's public universities is an epic hassle for higher education seekers. The admission tests are not only a battle of wits, admission seekers also have to go through an enormous trouble of travelling back and forth from one city to another to take the tests of different universities. This cumbersome admission process is challenging both physically and inward for several lakhs of admission seekers because they have to face a lot of problems regarding accommodation, food and transport. The one-test system would save on fees and accommodation and transportation costs and unlimited hassles of the admission seekers. Implementation of an integrated test method is very possible; its proof is the admission test of medical and dental colleges. PSC, JSC, SSC, HSC and other public examinations are also held simultaneously across the country. If the test board can take the same test on the same day, we can certainly do it.

Cluster-Wise Admission System is a system where universities will be brought under various clusters and a single admission test will be arranged for each cluster of universities. The study is aimed at flexibility of admission system and so student and parent get helpful to choose a desired university using this recommendation system.

Undergraduate admission system in Bangladesh are given below

- Public University Admission Test - Undergraduate level admission test. Each University has its own and individual admission test system. Different universities had different rules for the admission test. Each student is required to buy a separate admission form. In the same university, different units have to apply separately. The minimum qualification, application procedure, admission fees, admit card system, admission test format, test dates, merit score and pass mark are different in universities.
- Medical Admission Test - Undergraduate level medical Admission Test. It is a national level entrance examination. Students sit only for one test in their preferred district and are selected for the colleges all across the country as per their merit positions.
- National University admission test-In Nation University, there is no admission test, student only apply the application form with their college and subject choice with appropriate application fees. The merit list is made by using the SSC and HSC marks.

Public universities are the foremost choice of the majority students seeking higher education. This is for various reasons

- These universities offer wide range of subjects in Science, Commerce, Liberal Arts, Humanities, Engineering and Technology, Law, Education and Medicine disciplines
- Public universities attract the best brains and researchers as teachers although monetary compensation for them is anything far from attractive.
- Library, laboratory, internet and research facilities are much better there than anywhere else in the country.
- Seminars, workshops, debates, exhibitions and visiting teachers lecture series are often held in these institutions with a wide scope for national and international exposures for promising young knowledge seekers.
- Residential and boarding facilities at low cost/subsidized rates are available in these public universities.

1.2 Limitation of Traditional Admission System

The existing system of admission system is inefficient. Students are required to purchase forms separately from each university and have to go through separately. Every year, admission seekers and their parents or guardians face a huge amount of pressure. They travel from one part of the country to another to take admission tests. Condition of female

admission seekers may be worse. The guardians do not allow their adolescent to go anywhere alone in the admission test period due to lack of security accommodation. Most of them cannot or are not allowed to go alone to sit for admission test in various parts of the country. They must be accompanied by their near and dear ones. Where will they stay during the admission test days? Where will they have their meal? This cumbersome admission process is challenging both physically and mentally for several lakhs of admission seekers because they have to face a lot of problems regarding accommodation, food and transport. Many cannot reach admission centres in time while many others fall sick due to whirlwind journey. When political unrest forces universities to reschedule their test dates, need to reschedule the work. They don't have any suitable place to stay. Many of them take shelter in the university halls with the senior students. All the students may not have this kind of accommodation. The student wing of the party in power influence these students and they offer temporary accommodation on condition. They don't have well arrangement for taking food. When they take food outside, they suffer from diseases of various kinds on their way and in and around university campus. They spend more time, hard work and money. It is also possible that many students cannot participate in the exam due to failure to reach the destination in time. Many universities set the date of admission test date on the same day. A lot of money is required for admission test. By collecting raw data from online survey form, we observe that a candidate participates total nine university. To attend in a university, a candidate costs is around 3000-3500 taka. Total cost for a candidate is around 30000-35000 taka. For cost calculation, the unit price of a university, food, accommodation, traveling and other extra cost is considered. Not everyone has the power to spend so much money. Not just the cost of giving that test, the country has started a huge business in the name of coaching. There is no concrete evidence that coaching increases a student's likelihood of admission. On the other hand, the candidate from the rich person can take admission tests in many universities. But Poor examinee think they are lucky only if they can take examinations at one or two universities near the house. The girls attend less admission test because of harassment. For this reason, the universities could get less meritorious students. Our traffic system is haphazard and backward. We need to spend several hours together to reach a place a few kilometres away. It becomes more prominent during the admission test time because candidate have to move from one corner of the country to another. So, uncertainty is creating, can a student participate in the admission test at the right time? It also kills at least five months from the education life of the students to get enrolled in the universities after passing the HSC exams.

The UGC in its several annual reports terming it too expensive, questionable and coaching-oriented. In a survey conducted by the University Grants Commission last year, students mentioned huge overall costs and tests taking a great deal of time and causing hassles as the major drawbacks of the current admission test procedures at public universities. Many times, the admission test time is overlap so the candidate cannot attend the all of this universities. Once a student has decided to go to say University A then University B, C, and others where they applied have almost lost the candidate. After students get admitted somewhere and start classes, they normally don't move. So, individual cluster with a single admission test for each of them is necessary. The goal of my research is to reduce these hassles and brought under an individual cluster with a single admission test for each of them.

1.3 Research Objectives

The objectives of the research are as follows:

- i. To design public universities admission system model that will serve as the proposal to help the admission system for saving time, cost of the candidate and make it flexible.
- ii. To reduce the financial, physical and inward sufferings of the candidate and tensions of the guardian during admission test.
- iii. To fulfill the government's expectations about the integrated university admission test.
- iv. To reduce the large number of vacant seats, session time and making subject choice easy.

CHAPTER 2

LITERATURE REVIEW

A literature review discusses published information in a particular subject area, and sometimes information in a particular subject area within a certain time period. It can be just a simple summary of the sources, but it usually has an organizational pattern and combines both summary and synthesis. The followings are discussed, different types of existing research works.

Admission Process in Preston University is not effective. The objective of this study is to analyse the existing admission process of the Preston University and to give recommendations in order to improve it [1]. The study is descriptive and qualitative in nature. It will collect and analyse the qualitative data in general to reach a conclusion. The focus areas are conduct a detailed analysis of existing Admission Policy of Preston University, highlight the negative aspects of this policy which cause problems in achieving, university Objectives, give conclusions and recommendations in order to improve the Admission Process.

This thesis focuses on the problems of the Chinese University Admission (CUA) system. Within the field of education, the system of university admissions involves all of Chinese society and causes much concern amongst all social classes. This thesis explores a number of interesting aspects of the system. As a special case of the priority-based matching mechanism, the CUA system shares most properties of the Boston Mechanism, which is another example of a priority-based matching mechanism. But it also has some unique and interesting characteristics. Here introduce the main principles of the CUA system in detail and discuss stability, efficiency, strategyproofness, and other properties under different informational assumptions [2].

This thesis focuses a college admissions problem in which colleges accept students by ranking students' efforts in entrance exams. Students' ability levels affect the cost of their efforts. We solve and compare equilibria of centralized college admissions (CCA) where students apply to all colleges and decentralized college admissions (DCA) where students only apply to one college [3].

Every institute wants to have good student strength to allow a smooth academic session. This paper proposes the use of machine learning techniques in educational domain to enhance the quality of student admissions in any higher educational institute. The focus of this paper is to identify those admissions inquires which most likely to turn into actual admissions. The result of analysis will assist the academic planners to focus their efforts on the set of students that are likely to take admission in the institution after initial enquiry [4].

Equity in higher education is one of the major challenges higher education institutions and policy makers face today. The need to enhance equity in higher education raises difficult ethical dilemma such as: how equitable are affirmative admission policies if they are ethnicity or race based. This study tests a new model entitled Dual Admission Model which aims to enhance equity and equality in higher education while addressing many of the ethical dilemmas associated with affirmative action admission policies. Data of three consecutive national cohorts of New Zealand secondary school graduates were used to establish and test the effectiveness of a range of admission models. It is suggested that this Dual Admission Model (DAM) will increase participation and success in degree programmes for students from traditionally underrepresented groups without having to apply any affirmative action admission policy. Implications for policy makers are discussed [5].

This paper proposed the concept of using decision support system to integrate and utilize in term of admission to Higher Education in Thailand. We study the trends in 21st-century education, trends in transferring the curriculum of the students in Rajamangala University of Technology Suvarnabhumi (RUS) for seven years, and use the primary data to develop the model called A-DSS Model. The A-DSS model is the concept of developing the A-DSS system. The evaluation of the survey design that will be used to evaluate A-DSS system indicates that the system can support application and learning and teaching which help the RUS to filter the students according to background, skill, field to match the students' need and limitation of the University [6].

Using survey data from 1028 high school seniors and interview data from 54 participants, this study investigates the status quo regarding equity and access to higher education in China. Findings indicate that students from higher socioeconomic family backgrounds, better high schools, and more urban homes are more likely to be admitted into prestigious colleges. We conclude that the surface fairness of the Gaokao system that allocates students to different college prestige strata masks an underlying design of deep social inequity. Finally recommend strategies to reform the admissions process in order to achieve greater fairness in university access in China [7].

Now a day's students are interested in taking admission in college which having excellent educational history, good campus, placement, better facilities, university grant etc. But due to lack of proper information about each college present in particular university they deprive from choosing desired college. So Here proposes the recommendation system for the university that recommendation system and helpful to choose a desired college using this recommendation system [8].

CHAPTER 3

CONVENTIONAL UNIVERSITY ADMISSION SYSTEM

Here different countries admission systems are described in short. All the required and related factors within this system deployment process are noted here. University admission procedures vary from country to country, and sometimes from institution to institution in a country. In some countries, there are independent organizations or government agencies responsible for organizing centralized admission tests and the processing of applications.

3.1 Admission System in Bangladesh

Universities in Bangladesh are mainly categorized into three different types: public (government owned and subsidized), private (private sector owned universities), and international (operated and funded by international organizations such as the Organisation of Islamic Cooperation). There are different types of public university in Bangladesh. Each public university has its own and individual admission test system. Different universities have different rules for the admission test. Each student is required to buy a separate admission form. In the same university, different units have to apply separately. Each university has own individual Question type and pass mark, application system, selection system, the scoring system for making rank list is also different. Table 3.1 shows the information of university, which consists of university name, type admission process. (This information is collected from universities website on May 2018):

Table 3.1: Information of Universities

SERIAL NO.	UNIVERSITY	SPELIZATION	FACULTY	DEPARTMENT	ADMISSION PROCESS
1	DU	General	13	83	MCQ

2	CU	General	9	43	MCQ
3	RU	General	10	57	MCQ
4	JU	General	6	34	MCQ
5	IU	General	5	25	MCQ
6	KU	General	6	28	MCQ
7	JnU	General	6	36	MCQ
8	COU	General	6	21	MCQ
9	BRUR	General	6	21	MCQ
10	BU	General	6	20	MCQ
11	JKKNIU	General	4	19	MCQ
12	RUB	General	2	3	MCQ
13	BAU	Agricultural Science	6	43	MCQ
14	BSMRAU	Agricultural Science	5	35	MCQ
15	SAU	Agricultural Science	4	36	MCQ
16	SAU	Agricultural Science	6	47	MCQ
17	BUET	Engineering	5	18	WRITTEN
18	RUET	Engineering	4	28	WRITTEN
19	CUET	Engineering	5	15	MCQ
20	KUET	Engineering	3	18	MCQ
21	CVASU	Veterinary Science	3	18	MCQ
22	BSMRMU	Maritime	3	3	MCQ+WRITTEN

23	BUTEX	Textile Engineering	5	17	MCQ
24	SUST	Science & Technology	7	28	MCQ
25	HSTU	Science & Technology	9	47	MCQ
26	MBSTU	Science & Technology	5	15	MCQ
27	NSTU	Science & Technology	5	24	MCQ
28	JUST	Science & Technology	7	19	MCQ
29	PUST	Science & Technology	5	21	MCQ
30	PSTU	Science & Technology	8	58	MCQ
31	BSMRSTU	Science & Technology	7	23	MCQ
32	RMSTU	Science & Technology	2	2	MCQ

3.2 Admission System in Australia

Australia has centralised processing units for admission to undergraduate degrees such as Australian Tertiary Admissions Rank(ATAR), Special Tertiary Admissions Test(STAT) [9].

ATAR - ATAR is a percentile ranking used by universities to assist in the selection of school leavers for entry into undergraduate courses. ATAR courses are those developed by Universities Admissions Centre (UAC). The ATAR is a rank, not a mark. Australian universities are supported in the admission and selection of students for higher education by centralised admissions agencies across the Australian States and Territories. all Australian states adopted a common ranking system and nomenclature for undergraduate admissions known as the Australian Tertiary Admissions Rank (ATAR). The organisations of ATAR is divided into: Universities Admissions Centre, Technical and Further Education, Australian Qualifications Framework, Tertiary Education and Quality Standards Agency, Australian universities Quality Agency, Australian Council for Private Education and Training [10]. After the ATAR the student apply individually in

different university and the university chosen the student by their rank. The selection process is conducted by the university [9].

STAT – STAT is a scholastic aptitude test, used for entry into undergraduate programs at Australian universities for people without a recent ATAR. The test is designed by the Australian Council for Educational Research (ACER). Some institutions require the STAT to be undertaken for all applicants for certain courses. There are two different STAT tests:

- STAT Multiple-Choice test,
- STAT Written test.

The duration for the admission test is two hours. After the STAT the student applies individually in different university and the university chosen the student by their rank. The selection process is conducted by the university [11]. Besides ATAR or STAT, some universities taken additional admission i.e. personal qualities assessment test, questionnaire, interview.

3.3 Gaokao Admission System in China

In China the undergraduate admission system is known as Gaokao. Gaokao or the National College Entrance Examination, is required for admission to higher education in China. Students take this exam after completing secondary school. The Chinese Ministry of Education works closely with provincial education authorities, universities and college sectors to set all policy matters relating to higher education enrolment, and to assure that enrolment policy falls in line with central government priorities. The Ministry of Education oversees policy implementation, and sets guidelines for senior secondary curriculum content and examinations. The Ministry also oversees Gaokao examination content. The provincial education authorities are responsible for Gaokao student applications, conducting examinations, managing enrolment and setting policy according to provincial needs under the guidance of the Ministry of Education. Universities bear the third level of administration responsibility for enrolling students according to the guidelines set by the Ministry of Education [12]. The format 3+X is the most common, where 3 is the three national compulsory subjects of Chinese, mathematics and a foreign language and X refers either to arts or science subjects, depending on student choice. Some provinces add local requirements, for example in Shandong. The format is 3+X+1 where 3 represents the three national compulsory subjects, X the arts or science subjects, and 1 a basic living proficiency test. In all cases Chinese, mathematics and a foreign language are mandatory – the foreign language is usually English, although this may be substituted with Japanese, Russian or French. There are six other subjects, divided into two groups: science (physics, chemistry, biology) and arts (history, geography and political education). Students choose to follow one or other of these routes, and some versions of the Gaokao have an integrated science or integrated arts test, which assesses all three component subjects at the same time. The Gaokao examinations last nine hours spread over two days. The various examinations contain a mixture of different question types, including an extended essay-based question as part of the Chinese examination.

The tests comprise a mix of multiple-choice and short answer questions covering each of the subjects. The Chinese exam includes an essay-based section where the students are required to write an extended response to a stimulus scenario or question. On completion, the test papers are computer scanned and managed by the Provincial Education Authorities. Multiple-choice questions are marked through a computer program and the sections of the exam requiring individual marking are sent randomly (electronically) to two teachers for marking. If the variation on the mark is greater than five points, the paper is sent to a third teacher for the final mark. For the provinces that design their own Gaokao, the Ministry of Education (MoE) conducts an evaluation on the quality of the examination papers, after the Gaokao each year. The results are not made public but used as a quality assurance tool to ensure that each province is operating in accordance with the guidelines provided, and is consistent in student outcomes across provinces [13]. Varying across the different provinces and regions, students can list their university preferences prior to the Gaokao exam, after the exam, or once they learn their scores. Preferences are given in several tiers each of which can contain around 4-6 choices of institution and programme [14]. The University will calculate students' overall entry scores proportionally as follows:

Gaokao score: 60% of overall score.

University-administered test (if any): 30% of overall score

Previous results: 10% of overall score [15].

3.4 NCUEE Admission System in Japan

In Japan The National Centre Test for University Admissions is a type of standardized test used by public and some private universities . The Japanese education system puts major importance on the standardized test as qualifiers for all levels of education. The aim of the National Centre for University Entrance Examinations (NCUEE) is to improve the selection of candidates for admission to Japanese universities, and thereby to promote education at universities, high schools, and other educational institutions, through our work related to the National Centre Test for University Admissions. Test, which is conducted countrywide on the same day with the same questions. When individual universities select students to admit, they apply them own criteria to the results and take a multifaceted approach to determining the ability and aptitude of each person [16]. The test is administered by National Centre for University Entrance Examinations, an Independent Administrative Institution (IAI). The function of the Centre Test depends on the institution, There are separate tests for each subject, and each is multiple choice. The tests follow the curriculum guidelines published by the Ministry of Education, Culture, Sports, Science and Technology [17]. Two days exam. The examination type is MCQ and written. Full marks based on the admission test. Their contain a table for choosing the subject for admission test. Provision of the test results to the universities. Notification of individual test scores to the examinees. The selection and admission process are conduct by the university [16].

3.5 Vestibular Admission System in Brazil

In Brazil undergraduate admission system is known as Vestibular. The Vestibular is a main and common competitive entrance examination used by Brazilian universities for their admission processes. Undergraduate degree programme is organized by FUVES (Fundacao Universitaria para o Vestibular). Students can sit for this exam only once a year. The exam generally lasts for 3 days, with different fields of study being tested each day. Students are generally tested in following subjects- math, literature, biology, physics, history and the Portuguese language. Students must select their majors while registering for 'Vestibular'.

The format is split into 2 phases-

First Phase: This phase comprises of 90 multiple choice questions, including subjects such as Portuguese Literature and Brazilian Literature; Portuguese Language, History, Math, Geography, Chemistry, Foreign Language, Biology, and Physics. You're required to mark the answers on an answer card, and the marking is done later by an automated optical reader. Each graduation programme/course has its own minimum score. The student who gets the top and best score move on to the second phase.

Second Phase: This phase includes write-in questions about the same subjects. It goes on for 3 consecutive days-

First Day- includes 10 written questions and written essay on the subject provided by them.

Second Day- Includes 16 questions about the other subjects from the first phase. These subjects are considered to be in the High School syllabus. **Third day-** Also named as 'specific subject's day', comprises of 12 questions and evaluates the students in the particular field they applied to [18]. The exam in question tries to measure the knowledge acquired during elementary and high school education on subjects like Portuguese, English, Spanish, French, History, Geography, Biology, Physics, Mathematics, Chemistry. If a candidate passes this first stage, he/she will then be presented a series of open-ended questions on specific subject matters. The latter will depend on the type of studies an applicant wishes to pursue (e.g. someone wishing to pursue engineering studies, will be required to answer questions on subjects such as Mathematics, Physics and Chemistry). Students who score below that are automatically eliminated and do not proceed to the second stage, even if the maximum number of candidates has not been reached, although some schools make exceptions in the rare case of most candidates scoring below the cut-off [19].

3.6 Admission System in India

In India, university admission tests are organised by an independent body. Preference is given more to a student's performance in the tests than their past academic record. The applicants are ranked by their exam grades, and they can choose universities/programmes based on their grades. Among such entrance tests are the Joint Entrance Exam, Common Admission Test (CAT), etc. Most Indian universities participate in one or another centralized admission procedure. Some such common entrance tests are:

Joint Entrance Examination (JEE) is an engineering entrance examination conducted for admission to various engineering colleges in India. the Joint Entrance Examination (JEE)

Main is going to be conducted by the National Testing Agency (NTA). The Joint Entrance Exam will be conducted in two parts, JEE main and JEE advance. The aim of the common entrance test has been mooted to reduce stress on students, who have to appear for multiple entrance examinations and to give greater relevance to the school education, especially the class12 board examinations. In case of students who have appeared in both exams, the best of the two scores will be considered for the result. JEE Main consists of 2 papers, Paper 1 for B.Tech/ B.E. aspirants and paper 2 for B.Arch/ B. Planning. Paper 1 will comprise of objective type questions based on Maths, Chemistry, and Physics having equal weightage in the total of 360 marks while, paper 2 will be for 390 marks based on Mathematics, Aptitude and Drawing skills. Both the papers will be of 3 hours. Venue of JEE Main exam centres across different cities and states of country. While filling the application form of JEE Main, candidates will have to choose maximum of 4 exam centre cities [20]. Only the top of rankers in JEE (Main), which includes students from all categories will be eligible to appear in JEE Advanced for admission to IITs, IIT BHU and ISM Dhanbad. In JEE Advanced, there will be two question papers, each of three hours duration. The question papers will be bilingual (in English and Hindi). Each of the question papers will consist of three separate sections on Physics, Chemistry, and Mathematics. The questions will be of objective type, designed to test comprehension, reasoning and analytical ability of candidates. In some sections, incorrect answers will be awarded negative marks. The answers for each of the questions are to be marked on a separate, 2-sheet carbonless paper. Candidates are advised to click the below link to get the more details about JEE Advanced. There were 19 questions from each subject (Physics, Chemistry, and Mathematics) totalling to 80 marks. The total questions from all the subjects were 57 totalling to 240 marks [21].

BITSAT (Birla Institute of Technology and Science Aptitude Test) is a university-level common entrance exam, conducted by Birla Institute of Technology and Science (BITS). BITSAT is 3 hours of duration (without break). The test consists of four parts: Part I: Physics - 40 Questions Part II: Chemistry - 40 Questions Part III: (a) English Proficiency - 15 Questions (b) Logical Reasoning - 10 Questions Part IV: Mathematics/Biology (For B.Pharm. Candidates) - 45 Questions All questions are of objective type (Multiple Choice Questions) [22].

Vellore Institute of Technology (VIT) will be conducting VITEEE for B.Tech admissions. Admissions for non-engineering undergraduate programmes are granted on the basis of the applicants' 12th standard board exam results. It is mandatory for every student to have studied mathematics as a regular subject to be considered for admission. VIT offers academic programs in Engineering, Technology, Applied Sciences, and Management. It offers 20 undergraduate programs, 34 postgraduate, four integrated MS courses, and four doctoral programs. VIT consolidated its disciplines into 10 Schools of Study with the addition of the VIT Law School at its Chennai campus. Duration of the exam 2 hours 30 minutes, the Sections is Physics – 40 Questions, Chemistry – 40 Questions, Mathematics/Biology – 40 Questions, English – 5 Questions and Types of Questions is MCQ [23].

Xavier Aptitude Test or popularly known as XAT is a national-level management entrance test conducted by XLRI, Jamshedpur, for admission to management programs at XLRI and other XAT participating institutes across the country. XAT exam pattern states that it has objective (multiple choice questions) questions. The exam has four sections - Decision Making, Verbal and Logical Ability, Data Interpretation and Quantitative Ability (DI & QA), and General Knowledge. The XAT 2018 exam pattern

has undergone some major changes. The duration has been reduced from 3.5 hours to 3 hours, and the essay writing section has been cancelled this year onwards. The cut off is the minimum marks to be scored by a candidate in order to qualify for the admission process. If you qualify the XAT cut off criterion, you will be shortlisted for the selection rounds – Writing Test, Group Discussion and Personal Interview [24].

CAT (Common Admission Test) is a national level entrance examination, which is conducted for admission to management programs in Indian Institutes of Management (IIM's) and top B-Schools across the country. The test scores a candidate on the bases of Quantitative Ability (QA), Verbal Ability (VA) and Reading Comprehension (RC), Data Interpretation (DI) and Logical Reasoning (LR). Four scaled scores will be presented for each candidate: an overall scaled score and three separate scaled scores for each section. As the three sections evaluate distinct sets of knowledge and skills, scores do not correlate across sections. A high score in one section does not guarantee a high score in another section. Percentile rankings are provided for each individual section as well as for the overall exam score. The examination would be for 180 minutes, candidates have to be answered 100 questions in the stipulated time [25]. Common Law Admission Test (CLAT) is a national level entrance exam conducted for admission to 17 prominent National Law Universities in India [26]. CLAT is conducted by National Law University Odisha, Cuttack (NLUO) There will be as many as 200 questions having multiple-choice answer options. The candidates will be required to choose one correct option among the given answer options within two hours [27].

National Eligibility cum Entrance Test, popularly known as NEET UG, will be conducted by National Testing Agency (NTA).

Common Management Admission Test (CMAT) is an online computer-based test conducted by the All India Council for Technical Education (AICTE), India. It is a national-level admission test for facilitating institutions to select suitable students for admission in all management programmes approved by AICTE. The question paper comprises four sections: Quantitative technique, Logical, Language, and General. There are 25 questions in each section [28].

3.7 Admission System in United States of America

In the United States, there is no single, nationwide university admission system. Most institutions consider the candidate's performance on a standardized aptitude test such as the SAT or ACT. Secondary school performance is a key factor, and many institutions, particularly in the elite sector, require a considerable number of application materials, including essays, recommendation letters interviews, and in some cases, auditions and/or portfolios. Demographic factors and extra-curricular activities [29]. US institutions are autonomous, and students must apply to each institution directly. In addition, application procedures and requirements may vary considerably from one institution to another [30].

The SAT is the exam that will allow you to access the American university system. It is the most recognized exam to gain admission to American universities The SAT exam pattern having two distinctive formats, namely SAT Reasoning Test or simply SAT and

SAT Subjects Test. Both the SAT exam pattern have unique characteristics for evaluating aspirants' knowledge and skill. SAT governing body has prescribed individual SAT exam syllabus for both the formats. The SAT (Reasoning test) is conducted to evaluate candidates' Reading, Writing and Mathematical ability, while the SAT Subjects Test assesses test takers' expertise in specific subjects. SAT Format: SAT(Reasoning) Test, SAT Subject Test

Duration of exam is three hours (SAT without Essay and three hours 50 minutes (SAT with Essay)

Number of sections in SAT (Reasoning) Test Evidence-Based Reading and Writing, Reading Test, Writing and Language Test, Mathematics and Essay (optional). Overall score range of SAT (Reasoning)

Total number of questions in SAT (Reasoning) Test is 154 questions + 1 (optional essay). Type of examination Mostly objective. Number of Subjects in SAT Subject Test 20 [31] [32].

SAT Subject Tests :

If you want to study at a university in the United States, you must pass the SAT exam, because practically all four-year universities require exams such as the SAT for admission. In addition to this exam, the most recognized by United States universities, the universities of a higher and more demanding ranking require an additional examination known as the Subject Test [33].

ACT - The ACT (American College Testing) is a standardized test used for college admissions in the United States. The ACT measures general educational development in four curriculum-based areas: English, mathematics, reading and science. The four tests are measures of academic development that rely largely on students' ability to apply content knowledge and reasoning skill acquired in their coursework to high level tasks. There is also an optional writing section that requires examinees to write an essay [34].

3.8 Admission System in France

In France for higher education there contain National exam. Which known as baccalaureat. The baccalaureat often known as bac [35]. The general streams are Sciences, Economics and Social Sciences and Literature. There are three main types of baccalaureat: general baccalaureate, professional baccalaureate, technological baccalaureate For entrance to regular universities within France, however, there are some restrictions as to the type of baccalaureat that can be presented. In some cases, it may be possible to enter a French university without the bac by taking a special exam, the diploma for entrance to higher education. Though most students take the bac at the end of secondary school, it is also possible to enter as a candidat libre (literally, "free candidate") without affiliation to a school. Students who did not take the bac upon completion of secondary school (or did not manage to pass it) and would like to attend university, or feel that the bac would help them accomplish professional aspirations, may exercise that option. The exam is the same as the one administered to secondary-school students except that free candidates are tested in Physical Education, but students' Physical Education grade is calculated based on evaluation throughout the year [36].

3.8 Admission System in United Kingdom

Most applicants to universities in the UK take national examinations such as A-levels or Scottish Highers. Separate admissions tests are used by a small number of universities for specific subjects (particularly Law, Mathematics and Medicine, and courses at Oxford and Cambridge). The admission process is coordinated by a central organization, the University and Colleges Admissions Service (UCAS).

Students apply through a centralised applications system called Universities and Colleges Admissions System (UCAS). UCAS manages the applications and admissions process. Applicants can make up to five choices for most courses (different rules apply for applications to Oxford, Cambridge, medicine, dentistry and veterinary science) and there is no preference order. Applications are sent to all chosen universities and colleges at the same time but each university and college will only see details of choices for their course/s – they do not see a student's other choices until the student has received their final decision [37]. The application is then forwarded to the relevant institutions, each of which decides whether or not to accept the applicant based on its own standards and criteria. The type of admissions test you should take depends predominantly on the course you choose to study, and the university you choose to study at. The exams are subject-specific tests taken by applicants for Medicine, Philosophy, Politics, Economics, Law, Mathematics and other related courses [38].

In UK the Course-related admissions tests is conducted such as:

Law

- Cambridge Law Test
- LNAT – National Admissions Test for Law

Mathematics

- Mathematics Admissions Test (MAT)
- Sixth Term Examination Paper (STEP)
- Test of Mathematics for University Admissions

Thinking Skills Assessment

- Thinking Skills Assessment Cambridge (TSA Cambridge)
- Thinking Skills Assessment Oxford (TSA Oxford)
- Thinking Skills Assessment University College London (TSA UCL) [39].

CHAPTER 4

METHODOLOGY

4.1 Method

In this section a new model is introduced for public university admission system. In this method, we tried to eliminate some disadvantages of the traditional admission system to get more efficient system. Generally, the target dataset for this analysis is collected first and data will be in format of CSV (Comma-separated values) or XLS. These types of data set will be process by Microsoft Excel, Microsoft word. Design a format according to analysis. Then collect the opinions from different source. By collecting this opinion, we design a format using optimization technique and filtering. Finally finalized the new admission system technique.

A block diagram is a visual representation of a system that uses simple, labelled blocks that represent single or multiple items, entities or concepts, connected by lines to show relationships between them. It shows the schematic form the general arrangement of the parts or components of a complex system or process. The block diagram of the methodology is shown in Figure 4.1, which consists of data collection, filtering, data analysis, validity check and finalized the model.

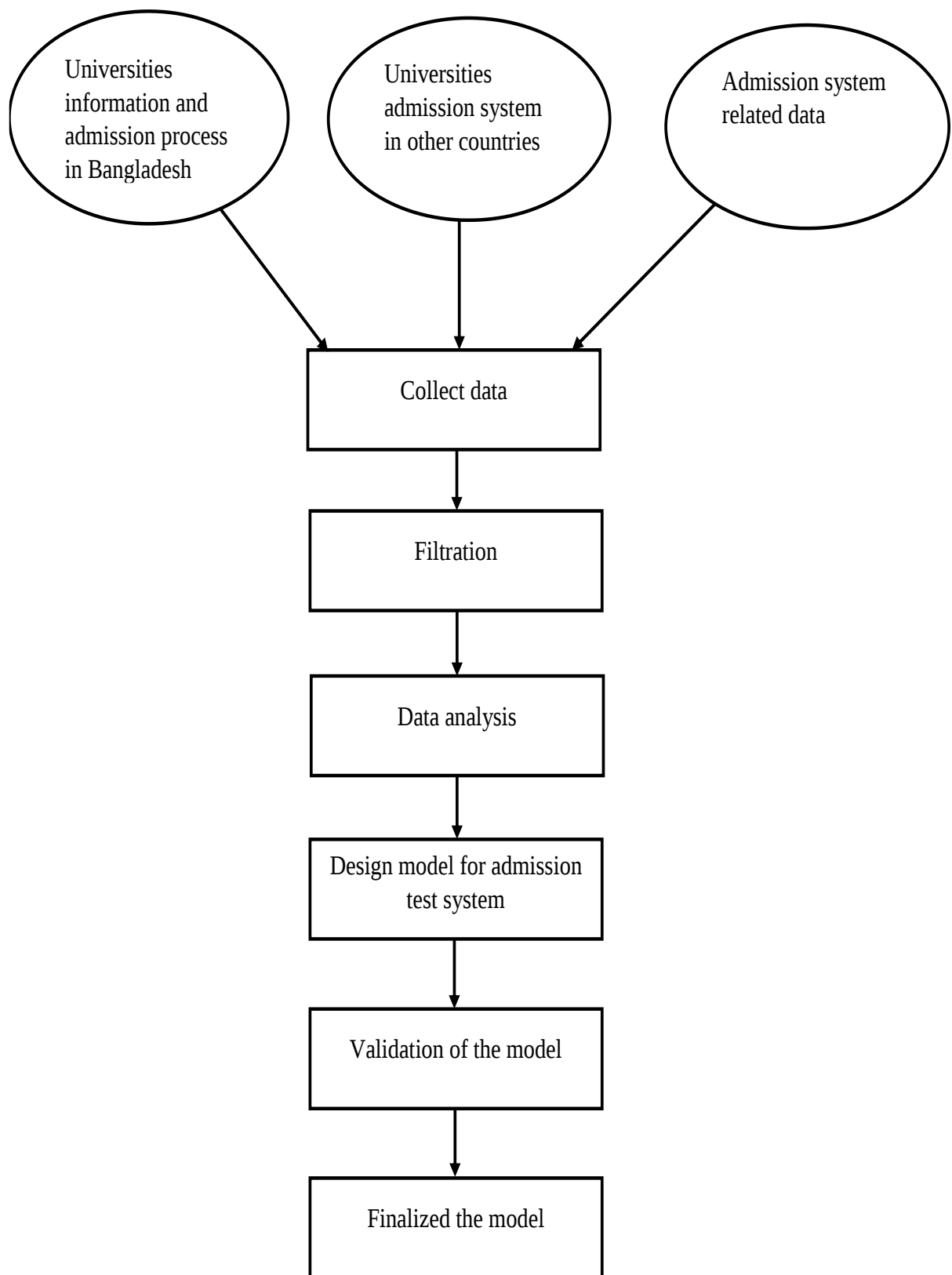


Figure 4.1: Block Diagram

The data analytics block schematic is shown in Figure 4.2.

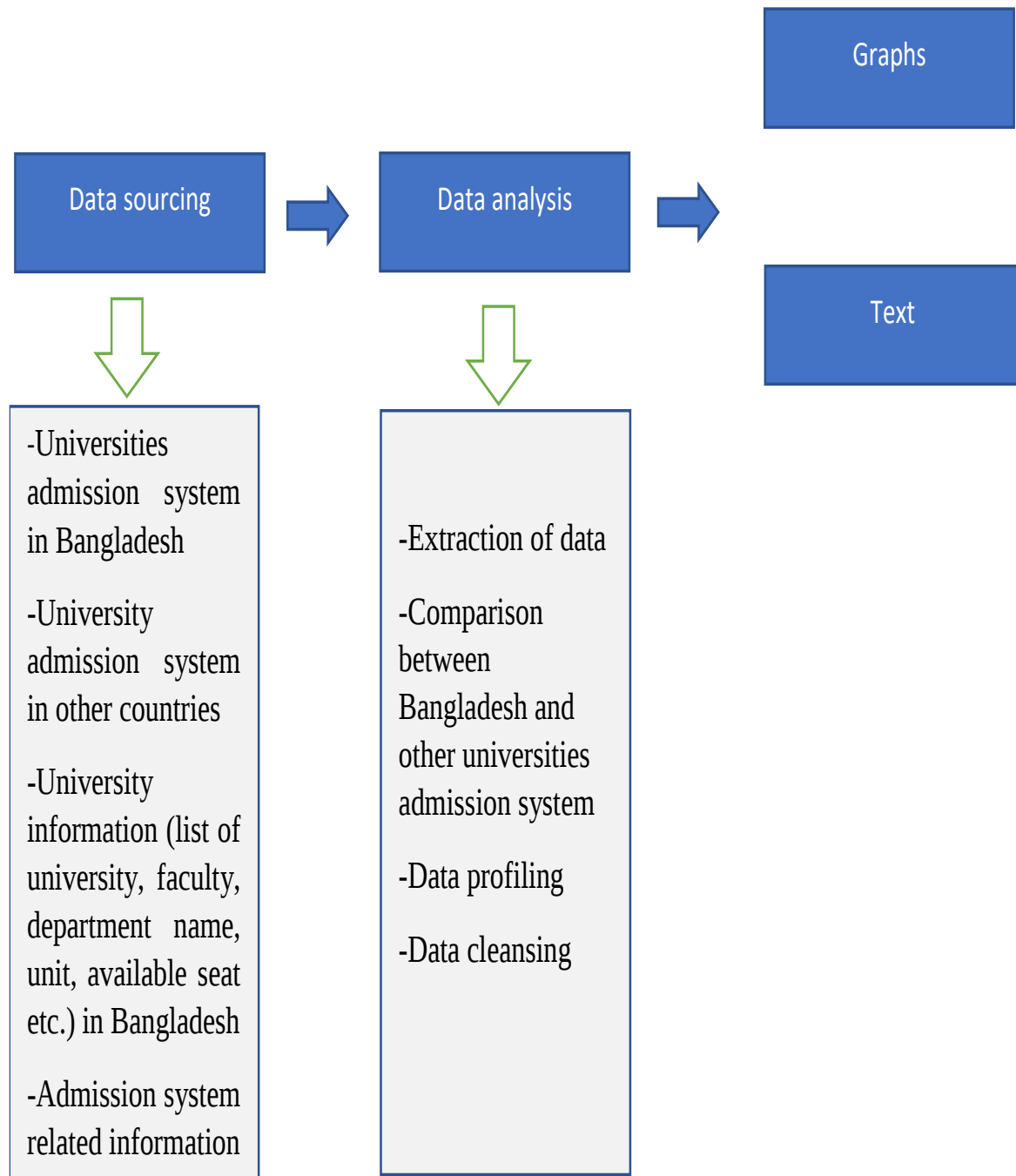


Figure 4.2: Data Analytics Block Schematic

Figure 4.2 shown that which pieces of information are collected and how this data is analysis. A flowchart is a formalized graphic representation of a logic sequence of work process. It shows the sequence of movements, functions or actions involved in system. The flow chart for methodology of this research is shown in Figure 4.3, which consists of work flow of raw data processing, reliability check, data analysis, model design and finalized the model.

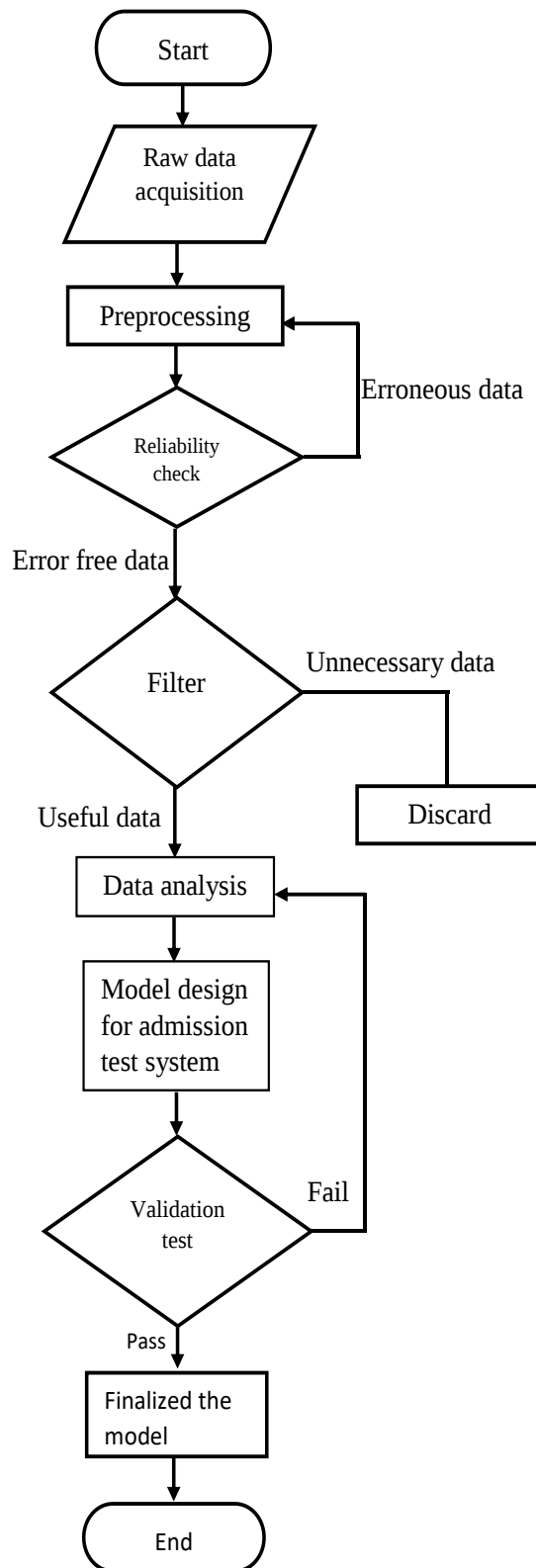


Figure 4.3: Flow Chart

4.2 Requirement

The following tools are needed for this thesis

- Data : University admission Test related data
- Hardware Requirement: Computer, Calculator
- Software Requirement : Microsoft Excel, Microsoft word , Adobe Photoshop, Browser etc.

4.3 Public University Information in Bangladesh

Public universities are many types such as Agricultural, Science and Technology, Engineering & Technology, Maritime Universities, Textile universities, Veterinary, General universities. There are 4 Agricultural Universities, 9 Science and Technology universities, 4 Engineering & Technology Universities ,1 Maritime University, 1 Textile university, 1 Veterinary University, 12 General universities. The Figure 4.4 shown the types of universities which consists of total 32 university.

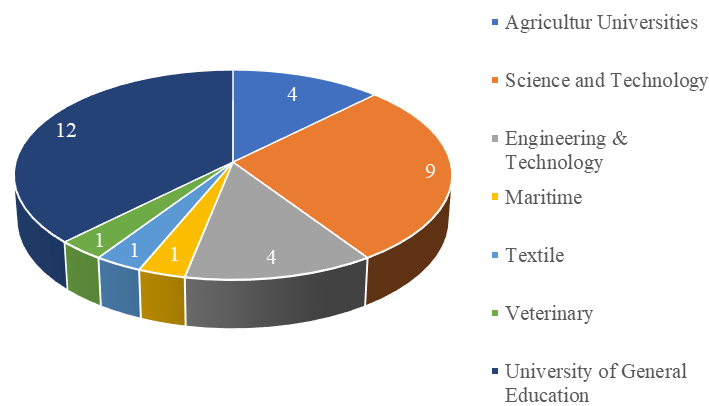


Figure 4.4: Types of University

Figure 4.5 shows the number of departments, which consists all university department number.

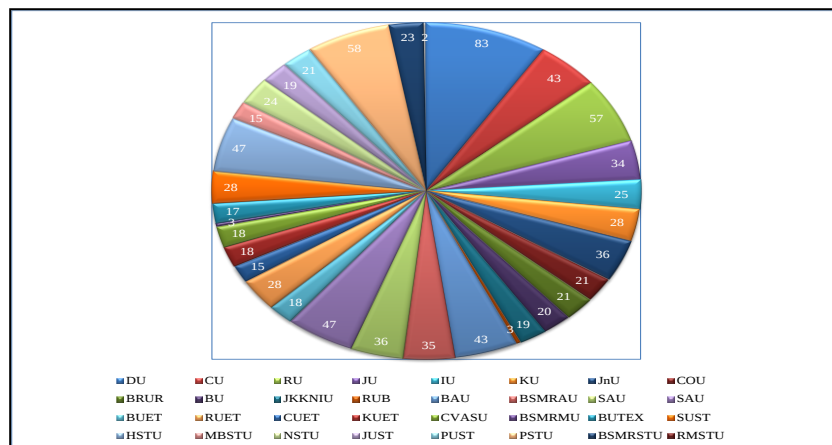


Figure 4.5: Number of Departments

Figure 4.6 shows the number of available seats, which consists 32 universities available seat

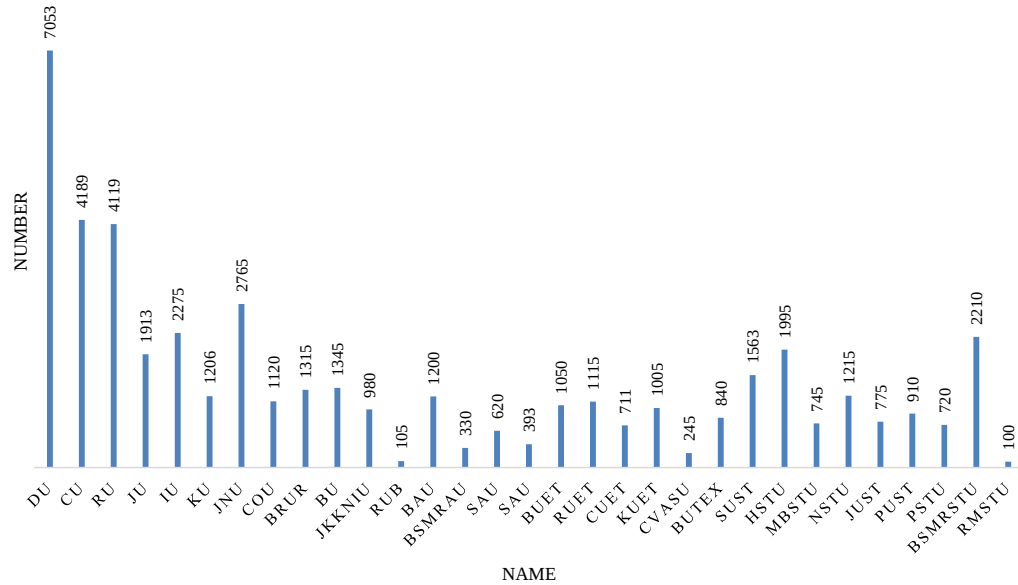


Figure 4.6: Number of Available Seats of Each University

4.4 Proposed Admission Test System for Public University in Bangladesh

According to analysis, three model has been designed for university admission test. The model is as follows:

- i. Integrated University Admission System (IUAS).
- ii. Cluster System Admission Based on Group (CSAG),
- iii. Cluster System Admission Based on Type of University (CSAT)

In below the three-admission system model is described briefly.

4.4.1 Integrated University Admission System (IUAS)

In Integrated University Admission System (IUAS), every student will face a single exam. But, if any student wants to get admitted into another group related undergraduate course, he must have to attempt some extra questions included in the same question paper.

According to IUAS model, for science student all engineering, general, science and technology, agriculture, textile universities will conduct one examination. For commerce student all general, science and technology universities will conduct one examination. For arts student all general, science and technology universities will conduct one examination. The Total Examination in this system is three. The IUAS diagram is shown in Figure 4.7, which consists of three integrated type, integrated-1 for science, integrated-2 for commerce, integrated-3 for arts students and university type.

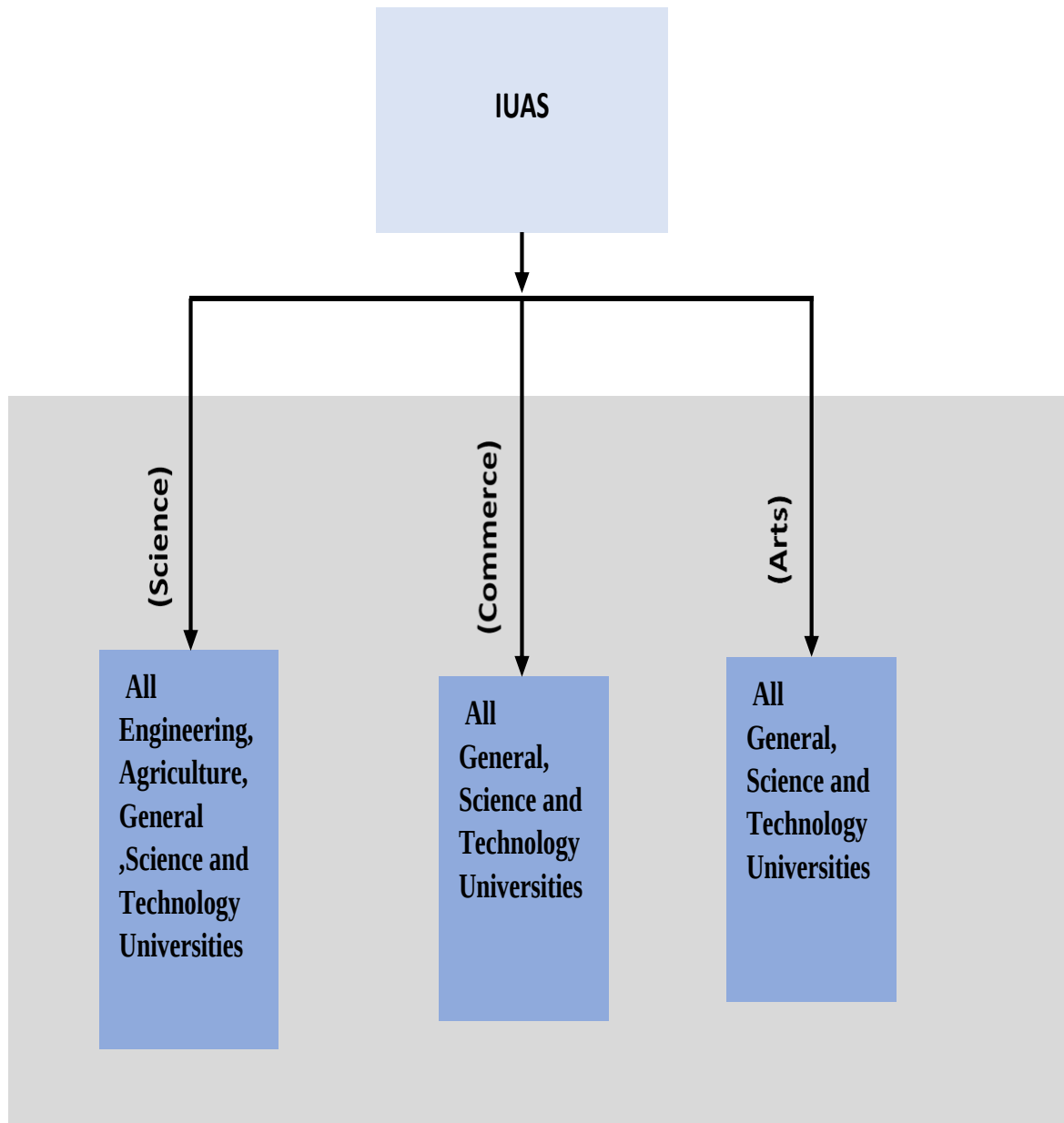


Figure 4.7: IUAS Diagram

The Integrated University Admission System table is shown in Table 4.1, which consists of three group with related university name.

Table 4.1: Integrated University Admission System

IUAS	Science	Engineering Universities, General Universities, Science & Technology Universities, Textiles University, Agriculture Universities	BUET, RUET, KUET, CUET DU, RU, CU, JU, IU, KU, JnU, BRU, BU, CoU, JKKNIU, RUB SUST, HSTU, MBSTU, NSTU, JUST, PUST, PSTU, BSMRSTU, RMSTU BUTEXT BAU, BSMRAU, SAU (Sher-e-Bangla Agricultural University), SAU (Sylhet Agricultural University), CVASU, BSMRMU
	Commerce	General Universities, Science & Technology Universities	DU, RU, CU, JU, IU, KU, JnU, BRU, BU, CoU, JKKNIU, RUB SUST, HSTU, MBSTU, NSTU, JUST, PUST, PSTU, BSMRSTU, RMSTU
	Arts	General Universities, Science & Technology Universities	DU, RU, CU, JU, IU, KU, JnU, BRU, BU, CoU, JKKNIU, RUB SUST, HSTU, MBSTU, NSTU, JUST, PUST, PSTU, BSMRSTU, RMSTU

4.4.2 Cluster System Admission Based on Group (CSAG)

In CSAG model the cluster is create based in the group of subjects. There are total five Cluster. In Cluster-1 there include all engineering subject for engineering, textile, general, science and technology and agriculture universities. In Cluster-2 there include all other subject that is not engineering but include in science group for agriculture, general, science and technology universities. In Cluster-3 there include commerce related subject for all general, science and technology universities. In Cluster-4 there include arts related subject all general, science and technology universities. In Cluster-5 there include group change related subject for all general and science and technology universities.

Each cluster will have taken separate exams in different time. Total examination for this model is five. Science group student can apply for three cluster. Two for their related group and one for group change. Commerce group student can apply for two cluster. One for their related group and another for group change. Arts group student can apply for two cluster. One for their related group and another for group change. The diagram for CSAG is shown in Figure 4.8, which contents the different Cluster for science, commerce and arts students and related university type name.

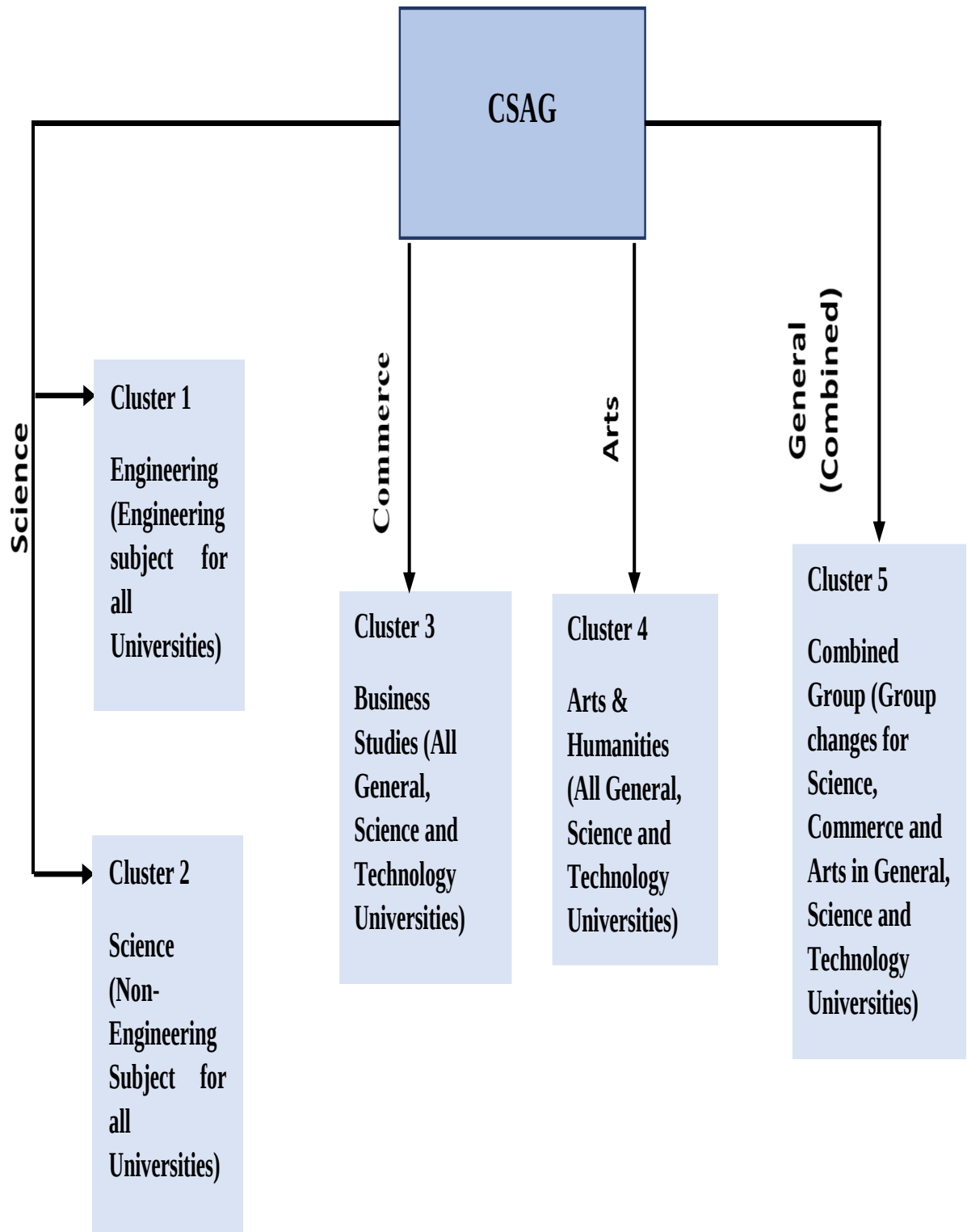


Figure 4.8: CSAG Diagram

The Table 4.2 is showing the Cluster System Admission Based on Group, which contains cluster wise university type name and university name.

Table 4.2: Cluster System Admission Based on Group

Cluster-1: Engineering	Engineering Universities	BUET, RUET, KUET, CUET
	General Universities	DU, RU, CU, JU, IU, KU, JnU, BRU, BU, CoU, JKKNIU, RUB
	Science & Technology Universities	SUST, HSTU, MBSTU, NSTU, JUST, PUST, PSTU, BSMRSTU, RMSTU
	Textiles University	BUTEXT
	Agriculture Universities	BAU, BSMRAU, SAU (Sher-e-Bangla Agricultural University), SAU (Sylhet Agricultural University), CVASU, BSMRMU
Cluster-2: Science	Agriculture Universities	BAU, BSMRAU, SAU (Sher-e-Bangla Agricultural University), SAU (Sylhet Agricultural University), CVASU, BSMRMU
	General Universities	DU, RU, CU, JU, IU, KU, JnU, BRU, BU, CoU, JKKNIU, RUB
	Science & Technology Universities	SUST, HSTU, MBSTU, NSTU, JUST, PUST, PSTU, BSMRSTU, RMSTU
Cluster-3: Business Studies (Commerce)	General Universities	DU, RU, CU, JU, IU, KU, JnU, BRU, BU, CoU, JKKNIU, RUB
	Science & Technology Universities	SUST, HSTU, MBSTU, NSTU, JUST, PUST, PSTU, BSMRSTU, RMSTU
Cluster-4: Arts & Humanities	General Universities	DU, RU, CU, JU, IU, KU, JnU, BRU, BU, CoU, JKKNIU, RUB
	Science & Technology Universities	SUST, HSTU, MBSTU, NSTU, JUST, PUST, PSTU, BSMRSTU, RMSTU
Cluster-5: General (Combined)	General Universities, Science & Technology Universities	DU, RU, CU, JU, IU, KU, JnU, BRU, BU, CoU, JKKNIU, RUB, SUST, HSTU, MBSTU, NSTU, JUST, PUST, PSTU, BSMRSTU, RMSTU

Cluster-wise Department Name for CSAG Model: In CSAG model for Cluster -1, after selecting the engineering related subject for engineering, textile, agriculture, general, science and technology universities we found a short department list. The Table 4.3 showing the department name of cluster-1 for CSAG model.

Table 4.3: Department Name for Cluster- 1

Architecture	Apparel Engineering	Biomedical Engineering	Building Engineering & Construction Management
Chemical Engineering	Civil & Water Resources Engineering	Civil Engineering	Computer Science and Telecommunication Engineering
Electrical & Electronic Engineering	Electrical and Computer Engineering	Electronics and Telecommunication Engineering	Energy Science and Engineering
Electronics & Communication Engineering	Glass and Ceramic Engineering	Industrial & Production Engineering	Information and Communication Technology
Leather Engineering	Materials & Metallurgical Engineering	Materials Science and Engineering	Textile Machinery Design and Maintenance
Mechanical Engineering	Mechatronics Engineering	Mechatronics & Industrial Engineering	Water Resources Engineering
Materials Science and Engineering	Petroleum & Mining Engineering	Urban & Regional Planning	Nuclear Engineering
Chemical Engineering & Polymer Science	Petroleum & Mineral Resources Engineering	Applied Physics & Electronic Engineering	Robotics and Mechatronics Engineering
Applied chemistry and chemical Engineering	Textile Engineering	Yarn Engineering	Fabric Engineering
Wet Process Engineering	Textile Fashion and Design	Dyes & Chemicals Engineering	Textile Engineering Management
Industrial and Production Engineering	Computer Science & Engineering	Information and Communication Engineering	Industrial Engineering and Management
Software Engineering	Civil & Environmental Engineering	Agricultural Engineering	Food Engineering
Food Engineering & Tea Technology			

For Cluster -2, after selecting the Non-engineering related subject for agriculture, general, science and technology universities we found a short department list. The Table 4.4 showing the cluster-2 department name for CSAG model.

Table 4.4: Department Name for Cluster- 2

Agriculture	Animal Husbandry	Agricultural Economics & Rural Sociology	Agribusiness Management
Agro Product Processing Technology	Agronomy and Agricultural Extension	Agrotechnology	Biotechnology and Genetic Engineering
Biochemistry and Molecular Biology	Biomedical Engineering	Botany	Criminology and Police Science
Clinical Psychology	Crop Science and Technology	Environmental Science and Resource Management	Food Technology and Nutrition Science
Coastal Studies and Disaster Management	Disaster Management	Disaster Science and Management	Environmental Science and Geography
Fisheries	Food Science & Technology	Forestry & Environmental Science	Statistics
Food Technology and Nutritional Science	Genetic Engineering & Biotechnology	Geography and Environment	Veterinary Medicine
Geology	Geology & Mining	Soil and Environmental Sciences	Microbiology
Meteorology	Oceanography	Psychology	Population Science & Human Resource Development
Public Health and Informatics	Soil Science	Urban & Regional Planning	Veterinary Science
Zoology	Environmental Science and Disaster Management	Environmental Science and Technology	Nutrition and Food Technology
Fisheries and Marine Science	Fisheries and Aquaculture	Geography and Environment Science	Soil, Water & Environment
Chemical and Food Process Engineering	Mathematics	Agricultural Economics and Business Studies	Chemistry
Agricultural Economics and Rural Development	Physics	Applied Mathematics	

For Cluster -3, after selecting the commerce related subject for general, science and technology universities we found a short department list. The Table 4.5 showing the cluster-3 department name for CSAG model.

Table 4.5: Department Name for Cluster- 3

Accounting & Information Systems	Accounting	Banking and Insurance	Business administration
Finance	Finance & Banking	Marketing	International Business
Tourism and Hospitality Management	Human Resource Management	Management Information Systems	Organization Strategy and Leadership
Management	Management Studies		

For Cluster-4, after selecting the arts related subject for agriculture, general, science and technology universities we found a short department list. The Table 4.6 showing the cluster-4 department name for CSAG model.

Table 4.6: Department Name for Cluster- 4

Arabic	Anthropology	Archaeology	Bengali
Bangladesh Studies	Bengali Language & Literature Discipline	Bangla Language and Literature	Criminology
Communication Disorders	Cultural Heritage and Bangladesh Studies	Criminology and Police science	Communication and Journalism
Education Administration	Economics and Sociology	Development Studies	Drama
English	Economics	Education	English Language and Literature
Folklore	Women and Gender Studies	Film & Media	Geography & Environment
Government & Politics	Local Government & Rural Developments	History	History and Bangladesh Studies
History and Civilization	Department of History and Archeology	Islamic Studies	Islamic History & Culture
International Relations	Japanese Studies	Journalism and Media Studies	Land Management and Law
Law	Law and Justice	Information Science and Library Management	Linguistics
Music	Mass Communication & Journalism	Persian Language and Literature	Pali and Buddhist Studies
Philosophy	Political Science	Public Administration	Population Sciences
Peace and Conflict Studies	Printing and Publication Studies	Pali	Political Studies
Public Administration & Governance Studies	World Religions and Culture	Rabindra Studies	Sanskrit
Sociology	Social Work	Social Welfare	Film and Television
Urdu	Television, Film and Photography	Bangladesh and Liberation War Studies	Language and Communication

For Cluster -5, after selecting the group changed related subject for general, science and technology universities we found a short department list. The Table 4.7 showing the cluster-5 department name for CSAG model.

Table 4.7: Department Name for Cluster- 5

Arabic	Anthropology	Accounting & Information Systems	Archaeology
Arabic Language and Literature	Accounting	Bengali	Banking and Insurance
Institute of Comparative Literature and Culture	Cultural Heritage and Bangladesh Studies	Bangla Language and Literature	Business Administration
Bangladesh and Liberation War Studies	Criminology	Communication Disorders	Criminology and Police science
Cultural Heritage and Bangladesh Studies	Development Studies	Disaster Management	Dance
Drama & Dramatics	Disaster Management	Economics	English Language and Literature
English	Education	Education and Research	Education Administration
Finance	Folklore	Fine arts	Film & Media
Geography & Environment	Government & Politics	Geography and Environmental Science	Human Resource Management
Health Economics	History and Civilization	History	History and Civilization
History and Bangladesh Studies	International Relations	Islamic Studies	Islamic History & Culture
International Business	Information Science & Library Management	Journalism and Media Studies	Japanese Studies
Information Science and Library Management	Linguistics	Law	Law and Land Administration
Law and Justice	Local Government & Rural Developments	Urban & Regional Planning	Mass Communication & Journalism
Management	Marketing	Marketing	Modern Languages
Organization Strategy and Leadership	Political Science	Persian Language and Literature	Pali and Buddhist Studies
Philosophy	Peace and Conflict Studies	Public Administration	Political Studies
Population Sciences	Peace and Conflict Studies	Printing and Publication Studies	Physical Education and Sports Science
Public Administration & Governance Studies	World Religions and Culture	Rabindra Studies	Sanskrit

Sociology	Welfare and Research	Social Work	Sociology
Social Welfare	Theatre and Performance Studies	Theatre	Television, Film and Photography
Tourism and Hospitality Management	Urdu	Music	Women and Gender Studies

4.4.3 Cluster System Admission Based on Type of University (CSAT)

In CSAT, the cluster is created by university type. There are total four types. One for engineering and textile universities, one for agriculture universities, one for science and technology universities and one for general universities. In Cluster-1 there include all engineering, textile universities. In Cluster-2, include all agriculture, veterinary, maritime universities. All general universities are included into another cluster. This cluster has four sub cluster one for science group which defined as cluster-3, one for commerce group which defined as cluster-4, one for Arts group which defined as cluster-5 and one for mixed (science, commerce arts students) which defined as cluster-6. All science and technology universities are included another cluster, It has 4 sub cluster one for science group which defined as cluster-7, one for commerce group which defined as cluster-8, one for Arts group which defined as cluster-9 and one for mixed (science, commerce arts students) which defined as cluster-10. Each cluster will have taken separate exams in different time. Total examination for this model is ten. Science group student can apply for six cluster. Four for their related group and two for group change. Commerce group student can apply for four cluster. Two for their related group and two for group change. Arts group student can apply for four cluster. Two for their related group and two for group change. The Figure 4.9 is shown the CSAT diagram, which consists of four type of university such as engineering, agriculture, general and science and technology universities.

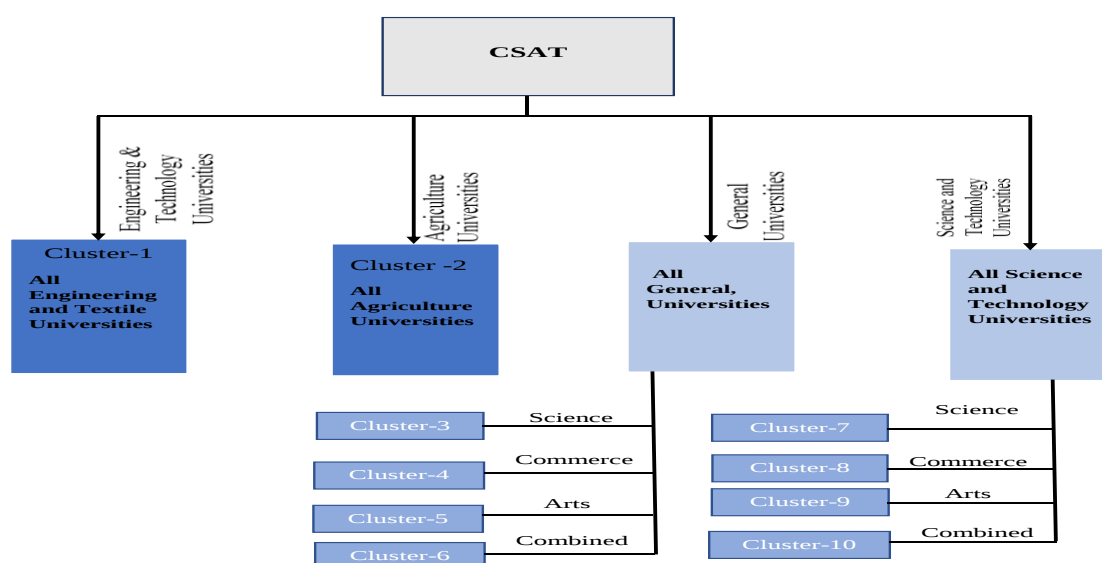


Figure 4.9: CSAT Diagram

The Table 4.8 is shown the Cluster System Admission Based on Type of University, which consists of type wise university and included university name.

Table 4.8: Cluster System Admission Based on Type of University

Cluster-1	Engineering Universities, Textiles University	BUET, RUET, KUET, CUET, BUTEXT
Cluster-2	Agriculture Universities	BAU, BSMRAU, SAU (Sher-e-Bangla Agricultural University), SAU (Sylhet Agricultural University), CVASU, BSMRMU
Cluster-3	General Universities (Science)	DU, RU, CU, JU, IU, KU, JnU, BRU, BU, CoU, JKKNIU, RUB
Cluster-4	General Universities (Commerce)	DU, RU, CU, JU, IU, KU, JnU, BRU, BU, CoU, JKKNIU, RUB
Cluster-5	General Universities (Arts)	DU, RU, CU, JU, IU, KU, JnU, BRU, BU, CoU, JKKNIU, RUB
Cluster-6	General Universities (Mixed)	DU, RU, CU, JU, IU, KU, JnU, BRU, BU, CoU, JKKNIU, RUB
Cluster-7	Science & Technology Universities (Science)	SUST, HSTU, MBSTU, NSTU, JUST, PUST, PSTU, BSMRSTU, RMSTU
Cluster-8	Science & Technology Universities (Commerce)	SUST, HSTU, MBSTU, NSTU, JUST, PUST, PSTU, BSMRSTU, RMSTU
Cluster-9	Science & Technology Universities (Arts)	SUST, HSTU, MBSTU, NSTU, JUST, PUST, PSTU, BSMRSTU, RMSTU
Cluster-10	Science & Technology Universities (Mixed)	SUST, HSTU, MBSTU, NSTU, JUST, PUST, PSTU, BSMRSTU, RMSTU

4.5 Admission System Management Procedure

Undergraduate Admission System Management (UASM): The admission system for undergraduate admission system is govern by University Grant Commission (UGC). This management system has some subpart which is given below:

Application management system: In the application management system include all application related items such as publishing admission circular, how to apply, payment system for admission, condition of the admission system and subject choice system maintaining after result published.

Seat plan and rank list management system: This part conduct with the roll number, center distribution, seat plan and making rank list after the admission test.

Examination and other related work system: In this part include question creating, operate the examination, admission process after examination and other relative work for admission system.

Security management system: The overall security is maintained by this part.

Standard quality agency: This part ensures the standard quality is maintain in admission test system. If any change is need then inform to the center management system.

Figure 4.10 shown the admission management system, which consists of many part for making the work easy.

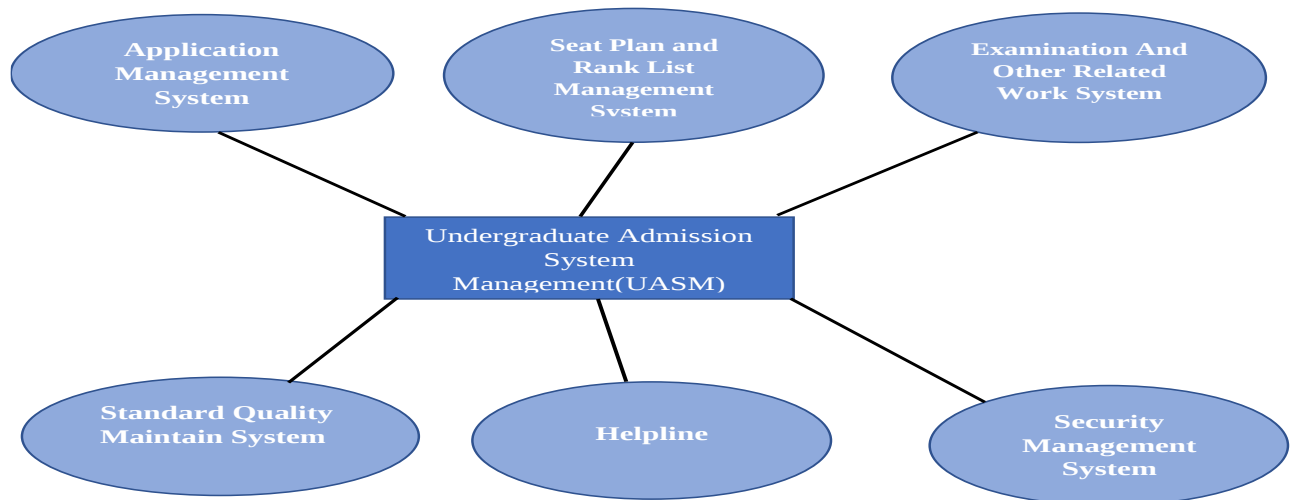


Figure 4.10: Admission Management System

4.5.1 Subject Choice List

Only The eligible candidate can fill up the subject choice form. This subject choice form system can follow for any admission model. In CSAG, we know there are total five cluster such as cluster-1, cluster-2, cluster-3, cluster-4, cluster-5.

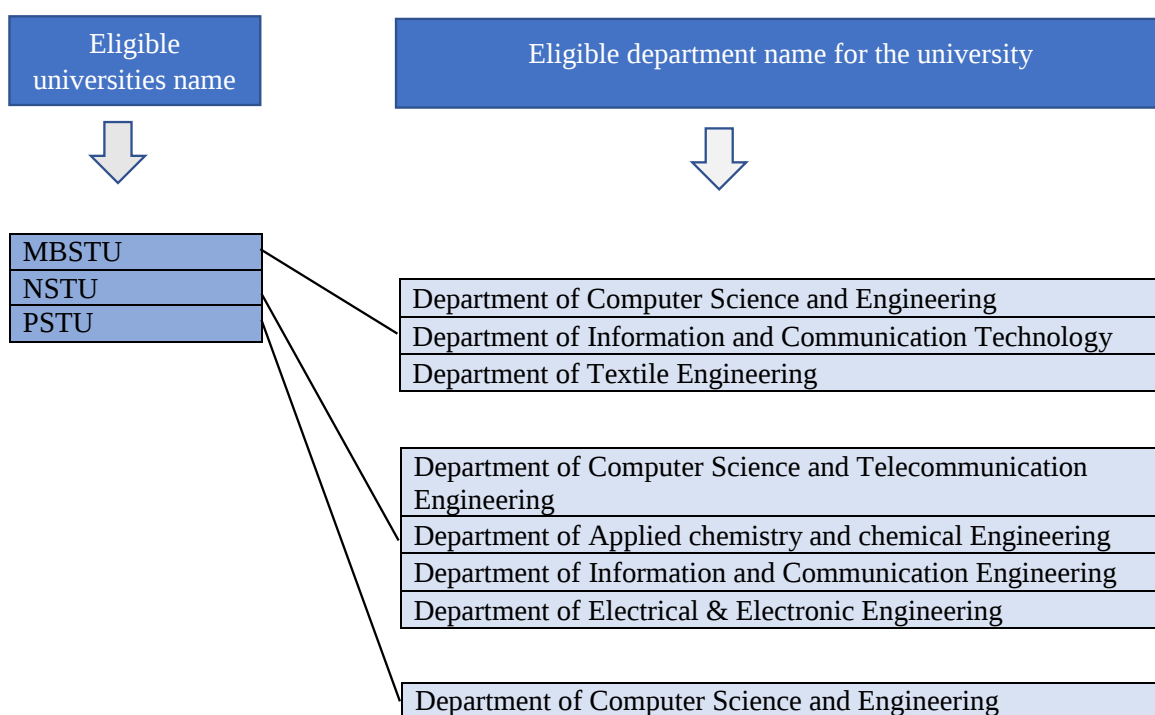
1. The candidate must be login first with selecting the cluster type and other necessary information. The Figure 4.11 shown the cluster name of the CSAG, which consist five cluster.



Figure 4.11: Cluster Name for CSAG

2. After successful login, the eligible university name is shown for this candidate. By clicking particular university, the eligible department name is shown for this candidate that he can choose. For subject choice, first select the university then select the department name. Automatically this will be listed in the preferred list. An example for this kind of selection is given below.

Example: If a candidate is login for cluster-1 then he could see the eligible university name for cluster-1. Suppose a student is eligible for MBSTU, NSTU, PSTU. By clicking MBSTU he could see the eligible department names such as Computer Science and Engineering, Information and Communication Technology, Textile Engineering. By clicking PSTU he could see the eligible department name such as Computer Science and Engineering. If his first choice is MBSTU [Computer Science and Engineering] then first click on the MBSTU then Click on the Computer Science and Engineering. Automatically this subject will be listed and display into in the preferred list as first choice. If his second choice is NSTU [Computer Science and Telecommunication Engineering] then first click on the NSTU then Click on Computer Science and Telecommunication Engineering. Automatically this subject will be listed and display into in the preferred list as second choice. If his third choice is MBSTU [Information and Communication Technology] then first click on the MBSTU then Click on Information and Communication Technology. Automatically this subject will be listed and display into in the preferred list as third choice. And continue this process to fill up the subject choice list. The Figure 4.12 shown the subject choice list process, which consists the eligible university, department name and display to see the preference list. Candidate can add or delete the preference list before submit the choice form list. The subject is assigning for a student according to their rank and their preference subject list.



Choice list of the student:

1. MBSTU [Computer Science and Engineering],
2. NSTU [Computer Science and Telecommunication Engineering],
3. MBSTU [Information and Communication Technology],
4. NSTU [Information and Communication Engineering],
5. PSTU [Computer Science and Engineering],
6. MBSTU [Textile Engineering],
7. NSTU [Applied chemistry and chemical Engineering],
8. NSTU [Electrical & Electronic Engineering].

Figure 4.12: Subject Choice List Process

4.5.2 Center Distribution, Merit Score and Admission Test Procedure

When a candidate applies for examination than he must choice the centre name for examination. The examination centre is distributed as division wise. The examination management group will conduct the examination with the help of the universities in that division. So, the university of that division is the main centre. Under this main centre there can be some subcentre. The examination centre is distributed as like as medical examination system in Bangladesh. Table 4.9 is shown the Division wise university name, which consist of division wise university number and the name.

Table 4.9: Division Wise University Name

Division Name	Dhaka	Chittagong	Khulna	Rajshahi	Mymensingh	Rangpur	Sylhet	Barisal
Number of Universities	10	6	4	4	2	2	2	2
Name of Universities	DU, JU, JnU, BUET, BUTEXT, MBSTU, BSMRSTU, BSMRAU, SAU, BSMRMU	CU, Cou, CUET, NSTU, RMSTU, CVASU	IU, KU, KUET, JUST	RU, RUB, RUET, PUST	BAU, JKKNIU	BRU, HSTU	SUST, SAU	BU, PSTU

Merit score: The merit score is creating based on two score. One for admission test score and another for previous (SSC, HSC or equivalent) result. According to this merit score the rank list is created. The duration of the examination should be long time. It may be 3 or 4 hours.

Admission test procedure: The admission test procedure can be saying as, X+Y system. Here X and Y can be defined as,

X= Related subject according to the cluster type,

Y= demanded subject by university.

Y is optional. If any university want to add new subject for test than this will be active and to admit that university candidate must be attend this subject test.

4.6 Testing

Performance testing is the process of determining the speed, responsiveness and stability of model. For performance test time, cost and suffering level is consider. Validation test is the process to determine whether it satisfies specified requirements. It ensures that the model actually meets or fulfils the needs. It answers to the question, Are we building the right product? For validation test we have taken online opinions, discussion with current student of university, candidate, guardian of candidate, check the model with respect to requirement.

Online opinions: For online opinion we first created a google docs with various parameters such as cost information of admission test, preference admission system and shared this document in Facebook.

Discussion with candidate and guardian: NSTU admission test was held on 26-28 October 2018. During this time, we were discussing with candidate and guardian about the proposed admission test system.

CHAPTER 5

RESULT AND DISCUSSION

This research presents model for university admission test system. It presents three model for admission system such as Integrated University Admission system (IUAS), Cluster System Admission Based on Group (CSAG), Cluster System Admission Based on Type of University (CSAT).

5.1 Test Result

Performance test of proposed three model with traditional system is given below:

Time: The IUAS, CSAG, CSAT is not time consume model with comparing traditional system because in traditional system individual examination is taken for all university, but in proposed there is no option for individual examination of university, so it is less time consume. The admission process for traditional system is very time consume.

Cost: The Traditional system is high costly than IUAS, CSAG, CSAT because in the traditional system the individual form is needed for all unit in a university and additional cost such as traveling, food etc. is required, but in IUAS, CSAG, CSAT this cost is limited.

Suffering: In IUAS, CSAG and CSAT model the suffering of the candidate and the guardian is more less than traditional. This model is also reducing the financial, emotional and physical sufferings of candidate.

Online opinion result: Overall the collected dataset contains more than eighty-three row data. By analysis this data we can say that, most preference admission system is CSAG, CSAT. Figure 5.1 shows the online opinion result.

Discussion result of candidate and gurdian: Most of the candidate and guardian also want to change the traditional system. They want new admission test process in Bangladesh. They also support CUAS and CSAT model.

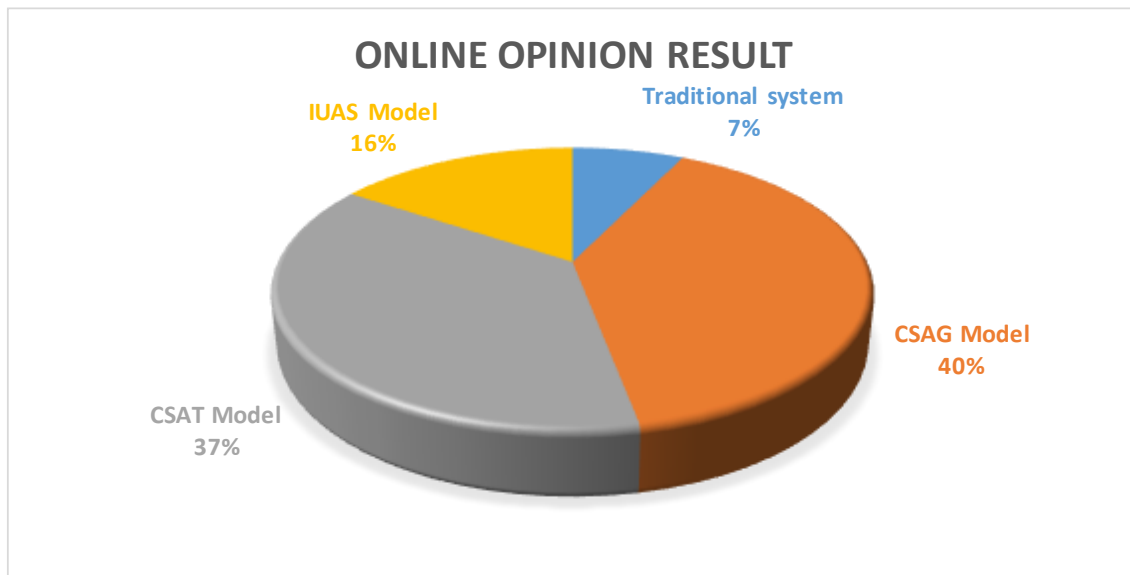


Figure 5.1: Online Opinion Result

From this figure it is clear that 40% of people want CSAG model, 37% of people want CSAT, 16% of people want IUAS model and 7% of people want traditional system.

Proposed model's performance and validation is best with comparing to traditional system.

CHAPTER 6

CONCLUSION

6.1 Conclusion

Unified admission test system is nothing new in Bangladesh. Medical colleges have implemented such a system long ago. In this research evaluate the possible admission system model, so that we can found the best solution for public university admission test in Bangladesh. The result of analysis will assist the academic planners to focus their efforts to taking admission test. This research provides model for university admission test system subject choice system and centre distribution system. It affects the timing of university enrolment and more flexible admission system. We have demonstrated various items related to the admission system this provides perfect accuracy in this research paper. On the basis of above findings, following conclusions are drawn:

- The Proposed Admission Policy is capable to achieve its targets.
- It is able to give quality students to the university.
- Limitation of existing process will be removed by applying this new model,
- This research enhances quality and ensures the advancement of university admission test system.
- This research achieve excellence in higher education comparable to global standards; to establish equity and guarantee access to higher education by anyone qualified to pursue it, and to prepare the learners as ideal citizens.

6.2 Future Work

To improve our admission system, we will provide quality admission system. Our format will prepare for combined university admission test. Our future work is to implementation one of proposed model.

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APPENDIX

A Screen-shot of Data Collection and Online Opinion

Information for Research Purpose

[We are conducting a survey as part of a research study "A Propose of Appropriate University Admission Test Process in Respect of Bangladesh" to accumulate the accurate information regarding the expenditure during your university admission test as mentioned below. In addition, we wish to determine a university admission test process (UATP). We are simply trying to capture your thoughts and perspectives regarding UATP. So, if you possess some different ideas please put it in comment box. The interview takes around 10-15 minutes and is very informal. Your responses to the questions will be kept confidential and will not be revealed during analysis and write up of findings. Your participation is valuable to our research and findings. Thank you for your help.]

*Required

Name *

Your answer

Email address/Phone number

Your answer

Student Id/Roll

Your answer

Session

Choose

Select a university which admission test information you want to give *

Choose

Number of unit you attended for admission test in this university *

Your answer

Admission Test fee per unit for this university *

Your answer

Traveling cost of admission test for this university *

Your answer

Accommodation and Food cost of admission test for this university *

Your answer

Other cost (if any) of admission test for this university

Your answer

Number of universities attended for admission test *

Your answer

Proposed (Three) admission system are as follows

A. Clusterwise Admission System:

In Clusterwise Admission System (IAS), there are total 7 units. 2 units for science students, 2 for commerce students, 2 for arts students and 1 for all students (combined unit).

Clusterwise System Diagram:

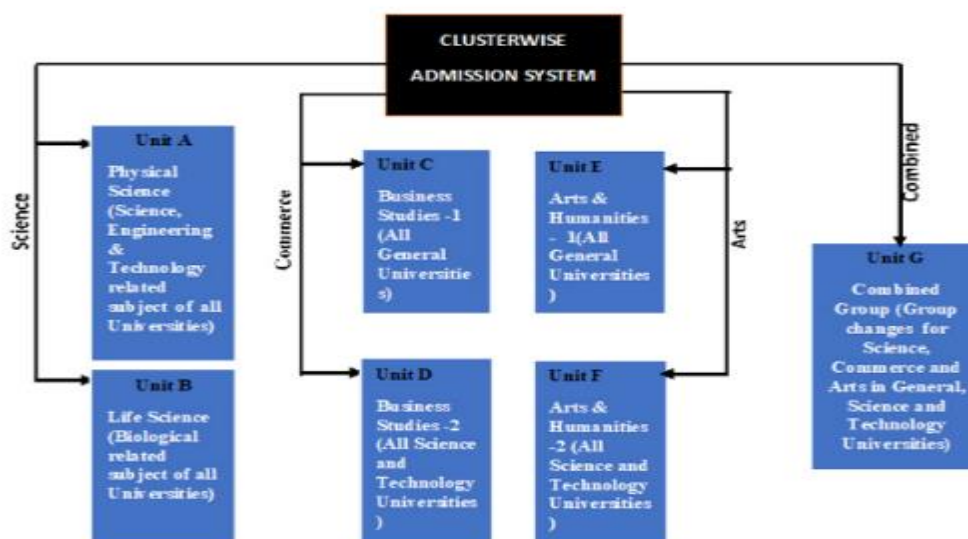


Table of Clusterwise System:

Unit A	Physical Science (Science)	Engineering Universities	BUET, RUET, KUET, CUET
		General Universities	DU, RU, CU, JU, IU, KU, JnU, BRU, BU, CoU, JKKNU, RUB
		Science & Technology Universities	SUST, HSTU, MBSTU, NSTU, JUST, PUST, PSTU, BSMRSTU, RMSTU
Unit B	Life Science (Sciences)	Textiles University	BUTEXT
		Agriculture Universities	BAU, BSMRAU, SAU (Sher-e-Bangla Agricultural University), SAU (Sylhet Agricultural University), CVASU, BSMRMU
		General Universities	DU, RU, CU, JU, IU, KU, JnU, BRU, BU, CoU, JKKNU, RUB
		Science & Technology Universities	SUST, HSTU, MBSTU, NSTU, JUST, PUST, PSTU, BSMRSTU, RMSTU
Unit C	Business Studies-1 (Commerce)	General Universities	DU, RU, CU, JU, IU, KU, JnU, BRU, BU, CoU, JKKNU, RUB
Unit D	Business Studies-2 (Commerce)	Science & Technology Universities	SUST, HSTU, MBSTU, NSTU, JUST, PUST, PSTU, BSMRSTU, RMSTU
Unit E	Arts & Humanities-1 (Arts)	General Universities	DU, RU, CU, JU, IU, KU, JnU, BRU, BU, CoU, JKKNU, RUB
Unit F	Arts & Humanities-2 (Arts)	Science & Technology Universities	SUST, HSTU, MBSTU, NSTU, JUST, PUST, PSTU, BSMRSTU, RMSTU
Unit G	Combined	General Universities, Science & Technology Universities	DU, RU, CU, JU, IU, KU, JnU, BRU, BU, CoU, JKKNU, RUB, SUST, HSTU, MBSTU, NSTU, JUST, PUST, PSTU, BSMRSTU, RMSTU

B. Integrated Admission System:

In Integrated Admission System(IAS), every student will face a single exam. But, if any student wants to get admitted into another group related undergraduate course, he/she must have to attempt some extra questions included in the same question paper.

Integrated System Diagram:

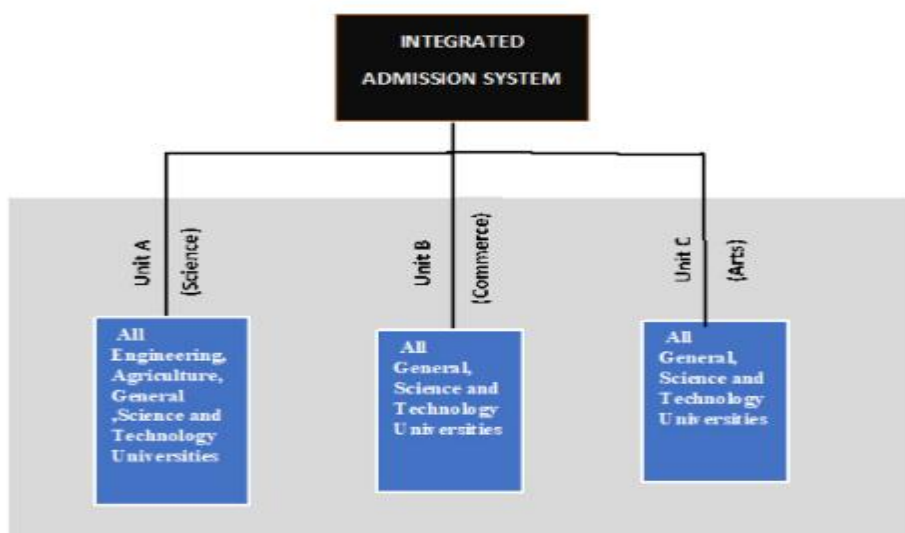


Table of Integrated System:

Integrated Admission System	Science	Engineering Universities, General Universities, Science & Technology Universities, Textiles University, Agriculture Universities	BUET, RUET, KUET, CUET, DU, RU, CU, JU, IU, KU, JnU, BRU, BU, CoU, JKKNIU, RUB, SUST, HSTU, MBSTU, NSTU, JUST, PUST, PSTU, BSMRSTU, RMSTU, BUTEXT, BAU, BSMRAU, SAU (Sher-e-Bangla Agricultural University), SAU (Sythet Agricultural University), CVASU, BSMRMU
	Commerce	General Universities, Science & Technology Universities	DU, RU, CU, JU, IU, KU, JnU, BRU, BU, CoU, JKKNIU, RUB, SUST, HSTU, MBSTU, NSTU, JUST, PUST, PSTU, BSMRSTU, RMSTU
	Arts	General Universities, Science & Technology Universities	DU, RU, CU, JU, IU, KU, JnU, BRU, BU, CoU, JKKNIU, RUB, SUST, HSTU, MBSTU, NSTU, JUST, PUST, PSTU, BSMRSTU, RMSTU

C. Groupwise Admission System:

In Groupwise Admission System (GAS), there are total 4 units. 1 units for science students, 1 for commerce students, 1 for arts students and 1 for all students (combined unit).

Groupwise System Diagram:

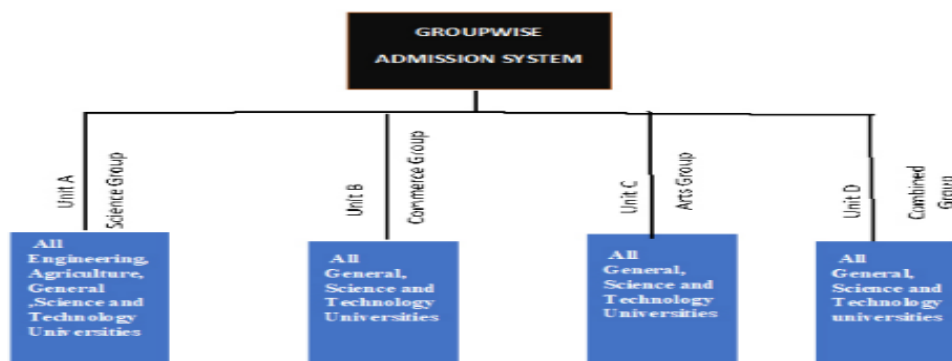


Table of Groupwise System:

Groupwise Admission System	Science Group	Engineering Universities, General Universities, Science & Technology Universities, Textiles University, Agriculture Universities	BUET, RUET, KUET, CUET, DU, RU, CU, JU, IU, KU, JnU, BRU, BU, CoU, JKKNTU, RUB, SUST, HSTU, MBSTU, NSTU, JUST, PUST, PSTU, BSMRSTU, RMSTU, BUTEXT, BAL, BSMRAU, SAU (Sher-e-Bangla Agricultural University), SAU (Sythet Agricultural University), CVASU, BSMRNU
	Commerce Group	General Universities, Science & Technology Universities	DU, RU, CU, JU, IU, KU, JnU, BRU, BU, CoU, JKKNTU, RUB, SUST, HSTU, MBSTU, NSTU, JUST, PUST, PSTU, BSMRSTU, RMSTU
	Arts Group	General Universities, Science & Technology Universities	DU, RU, CU, JU, IU, KU, JnU, BRU, BU, CoU, JKKNTU, RUB, SUST, HSTU, MBSTU, NSTU, JUST, PUST, PSTU, BSMRSTU, RMSTU
	Combined Group	General Universities, Science & Technology Universities	DU, RU, CU, JU, IU, KU, JnU, BRU, BU, CoU, JKKNTU, RUB, SUST, HSTU, MBSTU, NSTU, JUST, PUST, PSTU, BSMRSTU, RMSTU

Please select which system you suggest *

- ☐ Traditional System
☐ Clusterwise System
☐ Integrated system
☐ Groupwise System

Comment(If you have any different suggestion)

Your answer

SUBMIT