INTERGRATED SECONDARY STUDENTS SELECTIONS SYSTEMS (IOSSS)

\mathbf{BY}

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SCHOOL OF INFORMATION SCENCE AND TECHNOLOGY

KISII UNIVERSITY

KISII, KENYA

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SOFTWARE ENGINEERING

JANUARY, 2022

DECLARATION

Department of Computing Sciences

This research proposal is a result of my own effort in totality and in every aspects of the project works and has not been presented for an award of a degree in any other university. All information that had been obtained from other sources have been fully acknowledged.

Signature	Date
Name: Victor KuriaGroup leader	•
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DECLARAT	CION BY SUPERVISOR
This research proposal has been sub university supervisor.	omitted for examination with my approval as a
Signature	Date
Name: Dr. James Ogalo	

DEDICATION

We dedicate this report first and foremost to the almighty God who has been our guide since the beginning to this project. Furthermore, We want to dedicate this report to our lecturers for their continual impact of knowledge. To God is the glory.

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ACKNOWLEDGEMENT

Our sincere gratitude to Almighty God for the knowledge, wisdom and understanding that he has bestowed upon us as a group to successfully carry out this research with ease and efficiency.

We would like to express our thanks and gratitude to Dr. Ogallo who gave us this whole idea of developing a system for the placement of the primary school pupils that are about to join high school.

Lastly would also like to thank the entire Department of Computing Sciences of the Kisii University School of Information Science and Technology, the leadership and all lecturers who prepared us from the base of Software Engineering up to now.

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Fig 3.3.1	Phases of Development
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ABSTRACT

IOSSS is a website based system that gives an interface for a pupil who has done KCPE and wants to transit from primary school to secondary school chose their high school of choice. The system IOSSS enables the pupils view all the schools and their details like location, cutoff, population ,boarding/day school e.t.c. The pupil can the select school they wish to attend in number of choic , then enter their primary school details and their scores in the KCPE. The system automatically matches the pupils selection with the schools' requirement and with choice number. If the pupil chose first choice school X which is above their average score and if the school has already been selected by enough students it proceeds to the second choice on and on until the student is finally placed in a school meet the requirements of that particular school.

The system offers the site admins a user interface to view which students have been placed successfully. The system provides an interface for admins to adjust the requirements for their particular schools and also an admin can make other admins e.g teachers of various schools.

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CHAPTER ONE

INTRODUCTION

I.I BACKGROUD INFORMATION

Background Information

- Transitioning from the primary to secondary school using the previous method that relied on the use of letters.
- Letters always proved cumbersome for both the student and their desired schools of choice since it was expensive, had a lot of paperwork and the feedback channels were limited.
- Having a system that can bridge this gap between the students and their schools of choice is beneficial to both parties since:
 - a. Students can easily choose their dream secondary schools at the comfort of their homes.
 - b. It is cheaper for the students as they will not incur the cost of buying letters stamps to send their requests to their schools of choice.
 - c. The system helps the students to only apply to schools which they qualify for hence increasing their chances of being picked by at least one of the schools.
 - d. The schools can set the maximum number of students that can apply to be enrolled into their school and so it will be easier to pick students from a confined number that the school can easily handle.
 - e. Only students who have reached the school's pass mark can apply for enrollment into the school.
 - f. The school can avoid unnecessary paper backlog since no application letters are sent by students. It is therefore easier to pick students as everything is online as opposed to opening sent by students one by one in an attempt to find students who wish to be enrolled into their school.

1.2 STATEMENT OF THE PROBLEM

Since pupils started sitting for the Kenya Certificate of Secondary Education there has been never a system to ease the part of transition of pupils to Secondary school. Pupil apply to secondary in a manual way that is not impressive and effective as so many students choose schools which they end up not to be chose due to lack of knowledge. These has led to many pupils attending schools that they were not willing some even working hard so hard in the primary school education just to attend a school lower than their scores. This occurrence has discouraged a small number of pupils to be reluctant on working hard so that to attend a school of their and fight for their dreams.

Our system the Integrated Secondary School Selection System (IOSSS), offers each pupil to view and select their preferred Secondary school by comparing their marks entry and the available slots. The IOSSS will automate the traditional way which selection was done; make easy the selection process and enhance satisfaction to all parties including parents who will advise their children and ensure they are selected on their preferred schools.

1.3 OBJECTIVES

1.3.1 GENERAL OBJECTIVE

Design and implementation of our system the Integrated Secondary School Selection System (IOSSS)...

1.3.2 SPECIFIC OBJECTIVE

OBJECTIVES OF THE STUDY

GENERAL OBJECTIVES.

The system seeks to improve form one student's selection by reducing the time taken by secondary school heads to select students who have satisfied the cut off pons manually.

It also aims at improving the authenticity of the form one section process using an algorithm hence ensuring no biasness in the form one selection process

SPECIFIC OBJECTIVES.

The system aims to:

- 1. Capture all Candidates i.e. index no, name, sex, date of birth and school and register them into a database.
- 2. Capture all the applicants scores in every subject i.e. English, social studies, Kiswahili and science.
- 3. Give the student(applicants) a platform to make their choices of the secondary schools whose cut off points they have achieved.

1.4 SCOPE AND BOUNDARY

This projects aims to provide a web platform to predict the occurrence of a disease on the basis of the provided symptoms. Users will be equipped with the capability to create accounts and access the prediction service. The system is to record every prediction conducted by a user for future references. Users will also have the ability to access the contact information of the nearest doctor for further arrangements.

1.5 JUSTIFICATION

This system guarantees satisfaction to every pupil and parent on secondary placement process; this is made possible because each pupil will has an opportunity to choose their school of their dreams and view the details of that school before making the decision to avoid contradictions.

The system also ensures that each school get pupils of their level without much struggle according to their cutoffs.

CHAPTER TWO

LITERATURE REVIEW

1.0 INTRODUCTION

The traditional system of choosing pupils to Secondary schools was manual and hectic because the head master used a lot of time and had to check on the students manually. The pupil as well as the teacher faces the same problems. These early systems are dependent on paper-pencil systems for choosing purpose that means the records of scores of students and their details are in written form.

In Kenya the process of secondary school selection for pupils transiting from primary school to secondary school is manual. Forestal Primary school is a mixed day school which is based in Kakamega county, Lugari sub-county, Lumakanda ward; there the students are given a long list which is consist of schools ranked from National Schools down ward to local sub-county schools. This is done before the student has sat for K.C.P.E. the student is required to make six choices for each category of schools – National schools, extra-county schools and sub-county schools. After making all those choices, a list of every student has to be made by the class teacher combined with their respective choices and then finally handed over to the Head teacher who is responsible to take them to a local Cyber in the Shopping center where they are typed and filled. After the student has done the exams, the class teacher together with few selected teachers are called and instructed to send letters to schools which the student had choose if they attained the mean pass mark required to join that school.

The process of analyzing student choices and sending letters used to take along period roughly a month or two. The respective schools after receiving the letters would again check number of slots available, if the capacity is filled it will not send back feedback. So it is by luck and chance for someone to secure a chance to join a secondary school. For those students who by any circumstance are not able to join their previous wished schools are required to visit schools they wish to join and ask for a chance to join them and when they are granted that chance they are offered admission letter – this has been seen in most schools where students are admitted on second term and as they start their journey in secondary school others are continuing and is expected of them to catch up with the rest.

Even though the cabinet Secretary for Education gave an order for each student who sat for K.C.P.E. to join a high school, this government project has faced challenges since the government itself together with some of its partners has been on the forefront to make choices to those students for which schools to join based on the pass mark not considering their wish, capability of the parent among other factors. More so there are private Secondary school which a student together with the parent may agree upon. The private schools are not considered first when it comes to new students allocation hence it becomes a burden to them to advertise the vacancy to attract students who may have a wish to join them. The students who had been offered a chance to join the schools which was not of their will are forced to look for alternative schools they feel is the best for them.

In several cases the students end up picking schools that they do not fully understand the requirements of that particular school hence, cases of the students being placed to schools that are thought of low level comparing to their marks or being rejected because they did not attain a particular requirement for that school. Also, after the government took up the placement service most parents complained of their children offered a chance to a school far from home or an underperforming school (source: standard newspaper).

2.2 SUMMARY

The existing systems above provided a good research ground for my project. However, most if not all the systems that have had this research had it that it focuses on anyone who needs saloon services but this system will help university students make appointments online and allow them to have the saloon attendants come over to their areas of residences. This system will help head teachers to to get pupils their space for learning.

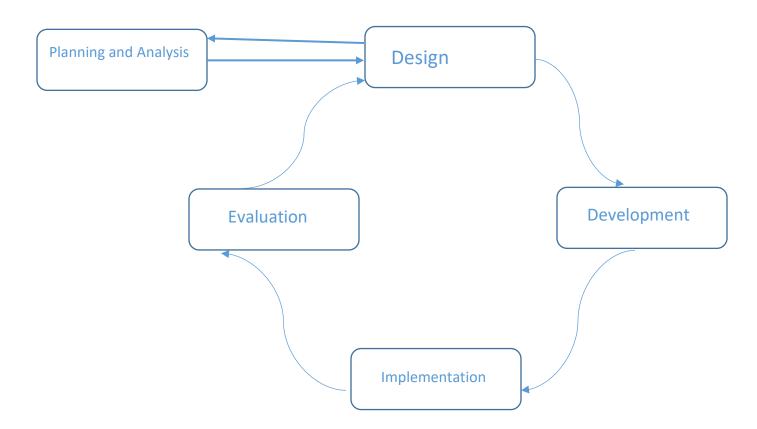
CHAPTER THREE **METHODOLOGY**

3.1 SYSTEM DEVELOPMENT METHODOLOGY

This section involves formulation of the methodological proposal, explaining the necessaries phases, roles, abilities, and skills that would be necessary to successfully accomplish the project. The project development process will involve five phases: Planning and Analysis, Design, Development, Implementation, and Evaluation.

Methods of collecting data

- 1. Observing
- 2. Past experience as primary school student.
- 3. Interviewing
- 4. Research over the internet
- 5. Brain storming
- 6. Research over newspapers



Planning and Analysis: The main action to be accomplished in this phase is the definition of the project scope, which should be accompanied with the analysis of requirements, in order to establish

or estimate times, as well as to evaluate the required knowledge on tools, technics, and technologies to be used.

Design: Once the requirements are defined (previous phase), they are gradually included in each design delivery, according to their priorities. Also, in this phase, the necessary information for the optimum implementation of the requirements must be compiled and complemented. Additionally, the interphase prototypes should be made in this phase, so they can be validated with the customer, and can be approved and improved to pass to the next phase.

Development: The development phase is the one that implies the major responsibilities within the interactive phases, because in this one, the approved. This phases shall involve the following sub phases:

Step 1: Data Preparation: The data required for training the model are visualized and inspected.

Step 2: Data Transformation In this step, the dataset is explored and necessary data is selected and the dataset is converted into machine understandable form.

Step 3: Feature Extraction Feature extraction is the process to reduce the size of data so as to only take informative, non-redundant and relevant data, so as to facilitate subsequent learning and generalization step to acquire better human interpretation.

Step 4: Implementation of SVM algorithm The SVM algorithm is used in this project, for training of the disease prediction model. When the algorithm is applied, it generates a rule set based on the observed pattern of data. On the basis of this rule set, the system training is done and the model is created.

Implementation: Once development is complete, the prototype must be applied, validated, and tested. The functionalities developed at each delivery are to be integrated, and the respective quality and integration tests be carried out. The model is to be deployed on a web platform using Flask framework.

Evaluation: After the completion of the implementation phase, the system is to be tested against real data. Should the system produce undesired outcome, the process is repeated. Otherwise the system is to be deployed for use.

3.2 SYSTEM ANALYSIS AND DESIGN TOOLS

The Integrated Secondary student Selection system is a web app with all functionalities which enables it to operate over the internet and browser.

Analysis of existing system

The existing system of secondary student selection is prone to a number of flaws many of which involve the human attributes of making errors, ignorance and biasness.

Problems with current system

- i) Big time schools usually scramble for the students with high aggregates leaving other schools to have no choice but select those that remain.
- ii) Student selection is open to biasness based on tribe i.e. school administrator's may be inclined to choose a student of the same tribe as him/her to join his/her school,
- iii) Student selection process is open to bribery by parents if they know a school's administrator.
- iv) A student may end up being selected into a school that they had no desire of joining.

Description of proposed system

The Integrated Secondary Selection system is a web based system used as an alternative way to do student selection for secondary school education. It has the following features:

- Student details (KCPE index number, name, date of birth, subject marks, 3 secondary school choices and their primary school they are graduating from) are entered into a form.
- Cut off marks of respective secondary schools are entered into a form and stored in a central database to be used in student selection process.
- School administrators' can view the students selected to join their schools by the system's algorithm.
- Student selection is done automatically by the system's algorithm based on school's cutoff marks, students' aggregates and student's school choices.

Advantages of proposed system

i) It eliminates biasness in student selection for schools.

- ii) It ensures fair distribution of well performing students among schools
- iii) It makes certain that students have a a better chance of joining their desired schools
- iv) Eliminates need for school administrators to be actively involved in student selection

Its technical advantages being a web based app are:

- Web apps require less memory resource to operate
- Web apps can be accessed over using internet enabled mobile phones and computers hence convenient to everyone with any of these devices.
- Web apps are fast compared to desktop apps

Requirement analysis and design

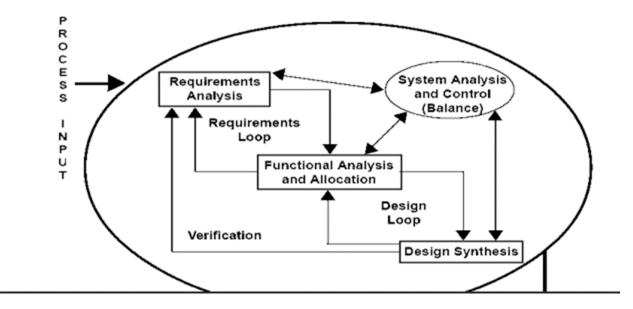


Figure 1: Requirement analysis & design process

The requirements of the system are collected by analyzing the needs of the user(s). This phase is concerned with establishing what the ideal system has to perform. However, it does not determine how the software will be designed or built. Usually, the users are interviewed and a document called the user requirements document is generated. The user requirements document will typically describe the system's functional, interface, performance, data, security, etc. requirements as expected by the user. It is used by business analysts to communicate their understanding of the system to the users. The users carefully review this document as this document would serve as the guideline for the system designers in the system design phase. The user acceptance tests are designed in this phase. There are different methods for gathering

requirements of both soft and hard methodologies including; interviews, questionnaires, document analysis, observation, throw-away prototypes, use cases and static and dynamic views with users. The requirement documentation will be referred throughout the rest of the system development process to ensure the developing project along with the need and requirements. Systems design is the phase where system engineers analyze and understand the business of the proposed system by studying the user requirements document. They figure out possibilities and techniques by which the user requirements can be implemented. If any of the requirements are not feasible, the user is informed of the issue. A resolution is found and the user requirement document is edited accordingly. The software specification document which serves as a blueprint for the development phase is generated. This document contains the general system organization, menu structures, data structures etc. It may also hold example business scenarios, sample windows, reports for the better understanding. Other technical documentation like entity diagrams, data dictionary will also be produced in this phase. The documents for system testing are prepared.

Architectural design

The phase of the design of computer architecture and software architecture can also be referred to as high-level design. The baseline in selecting the architecture is that it should realize all which typically consists of the list of modules, brief functionality of each module, their interface relationships, dependencies, database tables, architecture diagrams, technology details etc. The integration testing design is carried out in the particular phase. After the requirements have been determined the necessary specifications for the hardware, software and people and data resources and the information products that will satisfy the functional requirement of the proposed system can be determined. The design will serve as a blueprint for the system before these errors or problems are built into the system.

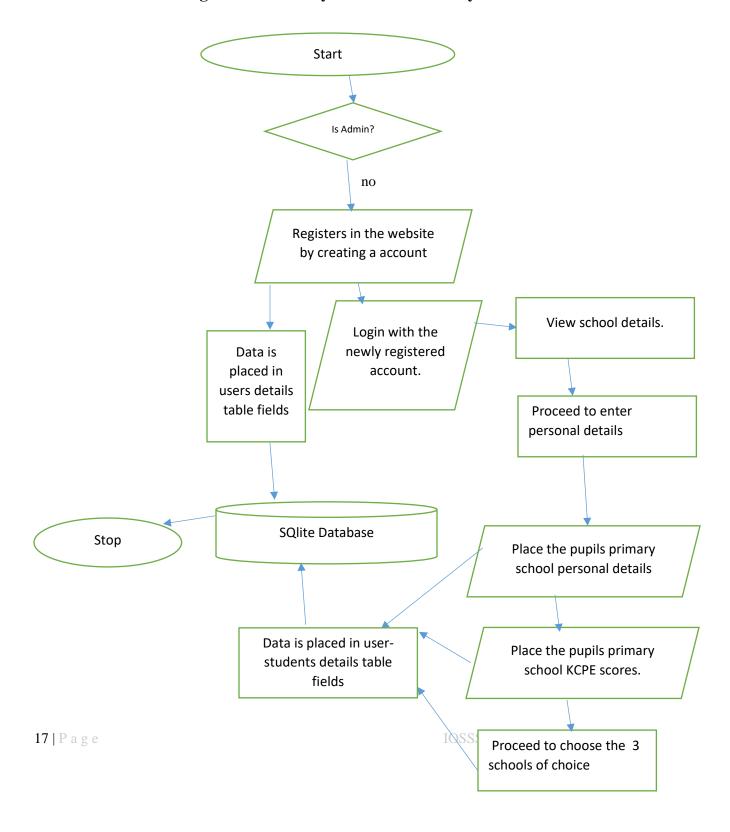
Module design

The module design phase can also be referred to as low-level design. The designed system is broken up into smaller units or modules and each of them is explained so that the programmer can start coding directly. The low level design document or program specifications will contain a detailed functional logic of the module in pseudo code:

• Database tables, with all elements, including their type and size.

- All interface details with complete API references.
- All dependency issues
- Error message listing
- Complete input and outputs for a module.

Flow Chart of the Integrated Secondary School Selection System



3.3 SYSTEM IMPLEMENTATION TOOLS

The following tools are to be used in the development and implementation of the disease prediction system:

Devices: Desktop or Laptop (at least 4 GB RAM, 200GB hard disk)

Programming frameworks: Django python framework ,React JavaScript framework

Programming languages: Python, Html, CSS, JavaScript, Bootstrap

Database Management System: SQLite

Editor: PYCHARM

3.4 SYSTEM TESTING AND VALIDATION

The testing approach to be used is the Bottom-Up Integration Testing. In bottom-up testing, each subsystem is tested separately and then the full system is tested. A subsystem might consist of many modules which communicate among each other through well-defined interfaces. The primary purpose of testing each subsystem is to test the interfaces among various modules making up the subsystem. Both control and data interfaces are tested.

The system is to be evaluated against real disease symptoms and the performance of the model reviewed for further actions.

CHAPTER FIVE.

Implementation of the HTML form to be filled by the applicants

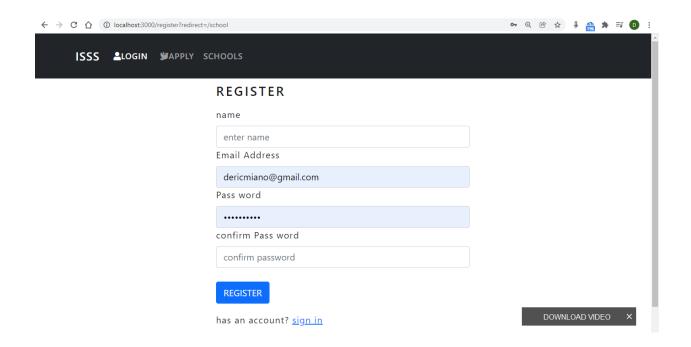
```
import React from "react"
import {useState, useEffect} from "react";
import {Link} from "react-router-dom";
import {Form, Button, Row, Col, FormGroup} from "react-bootstrap";
import {useDispatch, useSelector} from "react-redux";
import CheckOutSteps from "../components/CheckOutSteps";
import { register} from "../actions/userActions"
import FormContainer from "../components/FormContainer";
import {saveStudentsPriDetails} from "../actions/selectActions";
function StudentPriSchDetailsEntryScreen({history}) {
   const select = useSelector(state => state.select)
   const {studentPriDetails} = select
   const dispatch = useDispatch()
   const [username, setUsername] = useState(studentPriDetails.username)
   const [index_number, setIndex_number] = useState(studentPriDetails.index_number)
   const [sex,setSex] = useState(studentPriDetails.sex)
   const [DOB, setDOB] = useState(studentPriDetails.DOB)
   const [school, setSchool] = useState(studentPriDetails.school)
  const submitHandler = (e) => {
  e.preventDefault()
```

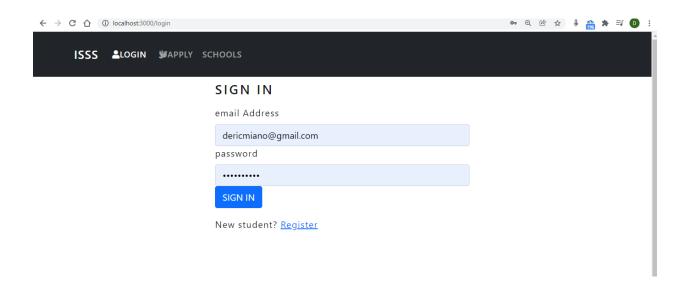
```
dispatch(saveStudentsPriDetails({username,index number,sex,DOB,school}))
   history.push('/studentEntryPriSchScores')
return(
    <FormContainer>
        <CheckOutSteps step1 step2/>
        <h1>students entry primary school details</h1>
        <Form onSubmit={submitHandler}>
            <FormGroup controlId={username}>
                <Form.Label>user name</Form.Label>
                <Form.Control
                type='name'
                required
                placeholder='enter student name'
                value={username}
                onChange={(e) => setUsername(e.target.value)}
                </Form.Control>
            </FormGroup>
            <FormGroup controlId={index number}>
                <Form.Label>index number</Form.Label>
                <Form.Control
                type='text'
                required
                placeholder='enter index number'
                value={index number}
                onChange={ (e) => setIndex number(e.target.value) }
                </Form.Control>
            </FormGroup>
            <FormGroup controlId={sex}>
                <Form.Label>Gender</Form.Label>
                <Form.Control
                type='name'
                required
                placeholder='enter gender'
                value={sex}
                onChange={ (e) => setSex(e.target.value) }
                </Form.Control>
            </FormGroup>
            <FormGroup controlId={DOB}>
                <Form.Label>date of birth</Form.Label>
                <Form.Control
                type='text'
                required
                placeholder='enter DOB'
                value={DOB}
                onChange={ (e) => setDOB(e.target.value) }
                </Form.Control>
            </FormGroup>
            <FormGroup controlId={school}>
                <Form.Label>school</Form.Label>
```

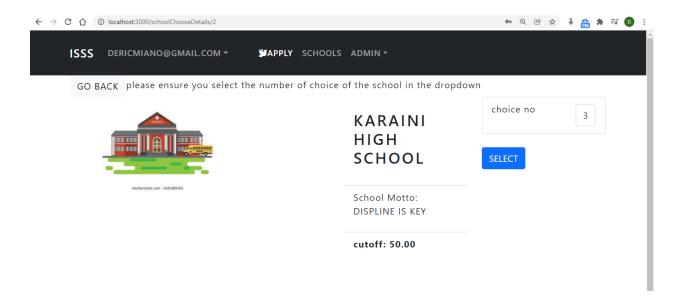
Implementation of the HTML form to be submitted by the applicants.

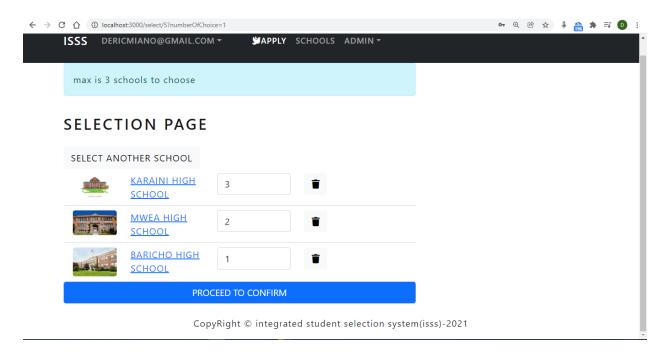
```
import React, {useState, useEffect} from "react";
import {LinkContainer} from "react-router-bootstrap";
import {Form, Button, Row, Col, FormGroup, Table} from "react-bootstrap";
import {useDispatch, useSelector} from "react-redux";
import Loader from "../components/Loader";
import Message from "../components/Message";
import {listApplications} from "../actions/applicationActions";
function ApplicationListScreen({history}) {
    const dispatch = useDispatch()
    const applicationList = useSelector(state => state.applicationList)
   const {loading, applications, error} = applicationList
   const userLogin = useSelector(state => state.userLogin)
    const {userInfo} = userLogin
        useEffect(() => {
        if (userInfo && userInfo.isAdmin) {
            dispatch(listApplications())
        }else{
           history.push('/login')
    },[dispatch, history, userInfo])
    return (
            <h1>successful applications</h1>
            {loading ? (
                <Loader/>
                : error ? (
                    <Message variant='danger'>{error}</message>
                        <Table striped bordered hover responsive className='table-sm'>
                        <thead>
```

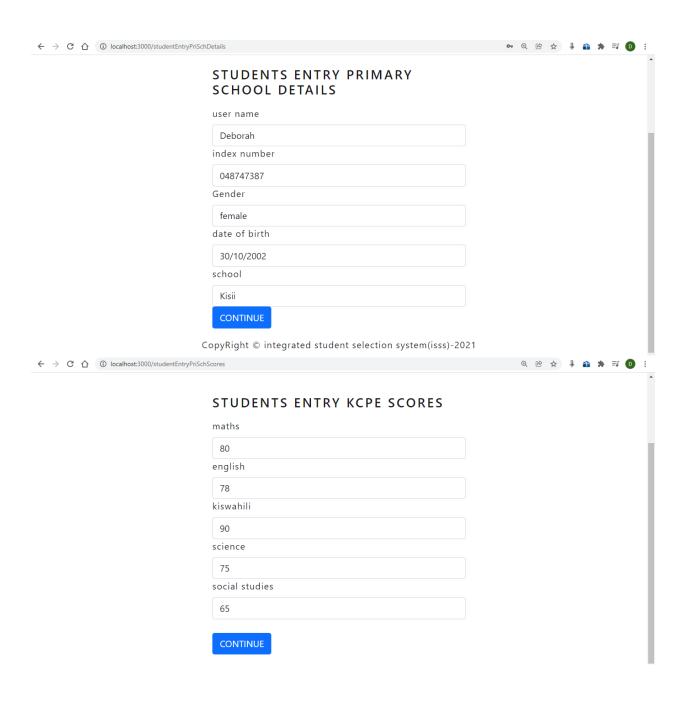
```
ID
                    {/*choice no*/}
                    USER
                    SCHOOL
                    population
                    Cutoff
                    average
                    </thead>
                 {applications.map(application =>(
                    {application._id}
                          {/*{application.numberOfChoice}*/}
                          {application.username}
                          {application.name}
                          {td>{application.numberOfstudents}
                          {td>{application.cutoff}
                          {application.studentScoreAverage}
                          <LinkContainer
to={`/application/${application.application}`}>
                                      <Button variant='light'</pre>
className='btn-sm'>
                                         details
                                      </Button>
                                   </LinkContainer>
                                ) ) }
                 </Table>
     </div>
  )
export default ApplicationListScreen
```

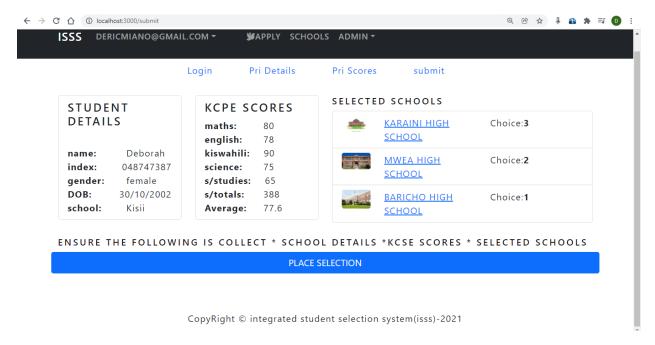




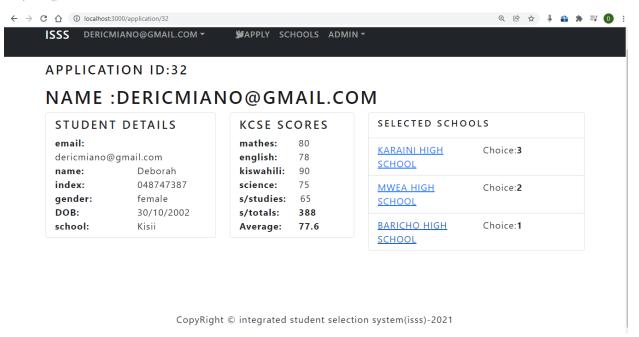


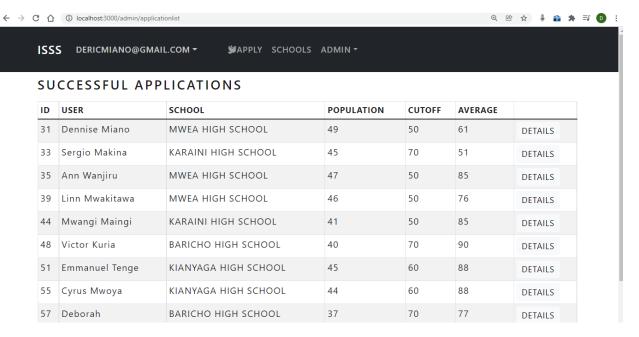






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Saloon Booking Application

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- 7. SQL (http://www.w3schools.com/sql/default.asp)
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Class lecture notes on database normalization. (handout PDFs by Mrs. Nyaigoti