1. Requirement Engineering
   1. Elicitation Activities
      1. Interview Plans

To find out the problem domain, an interview with four different interviewees of different roles were interviewed.

All the questions prepared for this interview are documented below.

Questions

* + 1. **Dr. Simon White (Course Leader)**
       1. Could you describe the life cycle of staff and the life cycle of a student?
       2. Will we be getting any further documents regarding the life cycle of students and staff?
       3. Is there any college policy of legal requirement that we must be aware of?
       4. Is there any specific design you want the software to include? For example, a particular theme, use of colours, the font style and so on.
       5. We are assuming not everyone who are accessible to the system can use all the functionalities? Could you briefly explain who can access which functionality and who is prohibited?
       6. Could you tell us about the performance requirements of the software like speed of data, storage capacity and accessibility among users?
       7. Could you explain the record management system, student information portal and corporate website mentioned in the system interface designs?
       8. Can teachers add data from both GUI portion and from the backend?
       9. In terms of all the modules, do you have any of higher priorities? If in case of chance of delay, is there a part we can skip?
       10. What will be the consequence of poor attendance?
       11. Any other information you would like to share with us as a course leader regarding the software and your expectation?
    2. **Mr. Adam Blake (Course Administrator)**
       1. How would you like to organize the students' records?
       2. Could you briefly explain the personal tutor management and report generation area?
       3. What is the diary management system? If you could also elaborate on its functionalities.
       4. What is the role of students in this system? Will they be able to access any functionality in any area or only view the specified data?
       5. Have you had any solutions or any ideas on how to solve the problems of the clerical system currently used?
       6. Is there any other information that you would want to highlight?
    3. **Dr. Raj Singh (Senior lecturer, Module leader, Personal Tutor)**
       1. So, what are your opinions about the system being digitized?
       2. Any functions you would want in the system for the teacher's convenience?
       3. Do you have any suggestions for the software development team?
    4. **Mr. Mark Williams (Existing student)**
       1. What help or services are you expecting from the digitized system?
    5. Interview Findings
       1. Interview Title: Initial Interview with the course leader – Simon White

Interview: Date: 08/05/2022

Duration: 10 minutes

Persons in attendance:

* Saurab
* Sadikshya
* Rohan

The questions and their respective answers for this interview are detailed in the table below:

|  |  |  |
| --- | --- | --- |
| Interviewer | Question Number | Question  Client - Response |
| 1 | Life cycle | |
| Sadikshya | 01 | Could you describe the life cycle of staff and the life cycle of a student?  Students could see the list of the courses. At the time when a student is not enrolled, he/she will have to submit required documents and functions. After the review of all the details submitted by the staff, it is verified. Maybe the student will be required to submit more important documents or will be rejected.  Then a module leader is assigned by the staff and all the follow ups will be conducted based on the system given by the module leaders and the tutors. |
| Saurab | 02 | Will we be getting any further documents regarding the life cycle of students and staff?  At the time, no any additional documents file is prepared regarding anything expect for the ones that is already provided. But in case of any need, it can be communicated through mail. |
| 2 | Policy or legal requirement | |
| Rohan | 03 | Is there any college policy of legal requirement that we must be aware of?  Must be aware of PII data that is Personally Identifiable Information. It will help identify a specific individual. So, this data should not be able to be shared among the students in the system. The PII data must be visible only to the administrative department authorised to this information as the data is also related to information security.  Even if it is not PII data, the academic information should only be visible and accessible to the related person.  From the security point of view, the particular roles like students, tutor, staff should not be given access to any other information except related to them. |
| 3 | Presentation style | |
| Sadikshya | 04 | Is there any specific design you want the software to include? For example, a particular theme, use of colours, the font style and so on.  For the font colour, theme and everything else, Nile can be taken as a reference. It could be used to create the UI of the system.  Other than that, there is no specific requirements. |
| 4 | Functionality accessibility | |
| Saurab | 05 | We are assuming not everyone who are accessible to the system can use all the functionalities? Could you briefly explain who can access which functionality and who is prohibited?  Regarding this topic, a list could be prepared listing the different roles and functionalities in the system. After that, from the client side, a mapping of the privileges and roles can be provided. Based on that matrix, the work can be done.  If after the development of the system some of the access or privileges are to be provoked, the system should provide a function in UI to remove such accesses.  Though at the very beginning it is not necessary to define which role has access to which functionalities. The administrator will handle the functionalities. With this matrix as a base, the development could be executed. |
| 5 | Performance Requirement | |
| Rohan | 06 | Could you tell us about the performance requirements of the software like speed of data, storage capacity and accessibility among users?  At the moment, there are no analytical reports. Hence, if talking about non-functional requirements, it would be good to see the webpage loading within 3 seconds.  As regard to others, the security mapping between the roles and authorised access to the functions is already specified. And about the back end development, backup of the codes should be maintained so that in case of any unfortunate problem, the codes can be easily retrieved. |
| 6 | System Interface Design | |
| Saurab | 07 | Could you explain the record management system, student information portal and corporate website mentioned in the system interface designs?  Put corporate website out of context here.  For the other two, they should be accessible easily. For the enrolment of students as well as better student experience, the student portal should be there. For record management system, as an admin or even as a staff should have their own portal so that they can access to specified functions. |
| Rohan | 08 | Can teachers add data from both GUI portion and from the backend?  Backend is not required for the teachers as it is only accessible to the administrators. |
| 7 | Module priority | |
| Saurab | 09 | In terms of all the modules, do you have any of higher priorities? If in case of chance of delay, is there a part we can skip?  Mobile implementation can be put in lower priority. From the priority point of view, student interface and teacher interface should be of higher priority than others. In fact, more focus on the student system such as being able to send enrolment requests, notifications regarding them.  Basically, delivery of functionalities from the student view should be highly prioritised and gradually can move to tutor and other staff. |
| 8 | Consequences | |
| Sadikshya | 10 | What will be the consequence of poor attendance?  If a student does not have at least 60% of attendance, the admit card will not be provided because of which they would be able to take their exams. |
| 9 | More information | |
| Saurab | 11 | Any other information you would like to share with us as a course leader regarding the software and your expectation?  As a course leader, what is wanted is being able to see what subjects are available in the course and what the modules are. Should have access to the course study materials uploaded by concerned authorities, and if required access to change the materials.  Also, see how the classes are going, their progress and participation is particular classes. Monitor how the assignments are happening and performance of each student. As a course leader, some of the requirements. |

Interview Title: Initial Interview with the course administrator – Adam Blake

Interview: Date: 08/05/2022

Duration: 10 minutes

Persons in attendance:

* Saloon
* Mukesh

The questions and their respective answers for this interview are detailed in the table below:

|  |  |  |  |
| --- | --- | --- | --- |
| Interviewer | Question Number | | Question  Client - Response |
| 1. | Student Record | | |
| Saloon | 1 | How would you like to organize the students' records?  Regarding the student record, student sends an enrollment request, and administrator should view and track all of the students who are enrolled in each specific course, and they will organize them according to his/her age, course, and academic session.  Administrator will also have the option to filtering the student by his/her batch, course, and case. Then, if they have access to Riddick or have approved the following inquiry, then they should follow up with the student if the extra document is requested, and so on. After a student has been enrolled, he or she can view their attendance, academic achievement, and whatever else he wants to see. | |
| 2 | Personal tutor management and report generation | | |
| Mukesh | 2 | Could you briefly explain the personal tutor management and report generation area?  Definitely, there should be the basic functionality. So, students should have the functionality to request a personal tutor if they require one. And the admin should have the functionality to allow or disallow the personal tutor. If they allow it, then only students will have access to the system and follow up.  For the report generation model, it provides the attractive report for all four types of user’s i.e. student, tutor, module leader and admin. So at least few reports should be available for each user type for delivery.  Let’s consider for an admin, a list of course is associated with the student like as attendance report, assignment progress report and so on. So, these are the admin report for the student.  Administrator also want to see the student academic progress that might be one report for them and also see the attendance report for the personal earlier for admin as a whole list of attendance for all the student would be there for the admin. And for the student, they should have the attendance details for the tutor, student record should be allocated to him.  And for the module leader, there should be the progress report of assignment and student participation is showing on report which is related to attendance and so on. At least two three reports for each type of users will be sufficient for this delivery. | |
| 3 | Diary management system | | |
| Mukesh | 3 | What is the diary management system? If you could also elaborate on its functionalities.  In terms of the diary management system, Whatever the functionality that provided is more relevant to, like sending the message or communicating with a particular tutor, then that functionality should be there. In addition to that, if there need to maintain a certain class, let's say some adult classes, that should be communicated to the student. So there should be considering at least two functionalities in short delivery for them. | |
| Saloon | 4 | What is the role of students in this system? Will they be able to Access any functionality in any area or only view the specified data? | |
| 4 | Solution for clerical system | | |
|  | 5 | Have you had any solutions or any ideas on how to solve the problems of the clerical system currently used?  Actually, there is no particular system that adds all the functionalities in one package. But some of the few modules in one system and another few models in another system that will be considerable. And check the course era or apex for some of the functionalities like the course management system, attendance, and exam management system. Some of the functionalities are not there, so investigate some other systems as well inside those kinds of functionalities. And get the reference as well to fill up the gap. | |
| 5 | Information | | |
| Mukesh | 6 | Is there any other information that you would want to highlight? | |

Interview Title: Initial Interview with the Senior lecturer, Module leader, Personal Tutor – Raju Singh

Interview: Date: 08/05/2022

Duration: 10 minutes

Persons in attendance:

* Saurav
* Rohan
* Sadikshya

The questions and their respective answers for this interview are detailed in the table below:

|  |  |  |
| --- | --- | --- |
| Interviewer | Question Number | Question  Client - Response |
| 1 | Opinion | |
| Saurav | 1 | So what are your opinions about the system being digitized?  As a lecturer, they should have the functionality to see the student’s record and his class report. And once a class has been created, and then they get to know which students were present at what time and how much time they spent into the class. Those functionalities must be there.  He wants to see the functionality for the assignment and dragging the progress or the submission, which happened once he read the assignment and published the results. These are the functionalities that he expects as a leader. |
| 2 | Function | |
| Rohan | 2 | Any functions you would want in the system for the teacher's convenience?  As a lecturer, he would love to see the requirements first which has been documented. So that he will give the conformation regarding the requirements and then software development team are following the valid from the methodology then that will be true so which will ensure that whatever the functionality or the working you have been visible or deliverable as a client. And he would have meeting at regular interval of time to help us to find out how the project is going on. |
| 3 | Suggestion | |
| Sadikshya | 3 | Do you have any suggestions for the software development team?  No any specific required file, he would like to give at the moment. So, whatever the file you have that is sufficient for this project. |

Interview Title: Initial Interview with the Existing student – Mark Williams

Interview: Date: 08/05/2022

Duration: 10 minutes

Persons in attendance:

* Saloon

The questions and their respective answers for this interview are detailed in the table below:

|  |  |  |
| --- | --- | --- |
| Interviewer | Question Number | Question  Client - Response |
| 1 | Services expecting | |
| Saloon | 1 | What help or services are you expecting from the digitized system?  As already talks about the functionality, whatever the functionalities have been allocated for the students that need to be organized and provided in the student’s portal. So that experience will be much better. |

* + - 1. Development Relevant Legislation

2.1.3.2.1 Equality Act:

The Equality Act of 2010 legally protects people against discrimination in the workplace and in society as a whole. We've replaced pre- taboos with a single law that's easier to understand and, in certain cases, enhances protection. It shows the various ways in which it is illegal to treat someone.

Equality Act provisions, effective October 1, 2010:

1) Basis for protection against direct and indirect discrimination, harassment and harm in public, office, work, education, association and traffic. Frames.

2) Modifying the definition of sex reassignment by removing the requirement for medical supervision. 3) Protects people who are believed to have protected characteristics or who are discriminated against because of their relationship with someone with protected characteristics.

4) More obvious protection for nursing mothers.

5) Applying a stable definition of indirect discrimination to all protected establishments.

6) Harmonizing the regulations that allow voluntary and positive behavior.

2.1.3.2.2 General Data Protection Regulations (GDPR):

The supplied software or system for Woodland University College will contain many types of data and information regarding students, academic staff, modules, or persons who are directly or indirectly associated with the college and its new computerized system. Because the information gathered is so sensitive, it must be handled responsibly and in accordance with particular rules and regulations.

Different requirements should be enforced under the Data Protection Act 2018 of the United Kingdom (UK), as stated by the General Data Protection Regulation (GDPR) required in law. According to GOV.UK, 2018, the following are the regulations of privacy and protection of data and information maintained inside the system.

1) Data should be used lawfully and transparently.

2) Data should only be collected for specific and stated purposes.

3) Relevant data should be used sparingly.

4) The information should be used in a suitable and applicable manner.

5) Unnecessary data storage should be limited.

6) The data should only be used within a certain organization's system.

7) Only certified employees of the organization should have access to the organization's key data and information.

2.1.3.2.3 Education Relevant Legislation:

The Education Act 2011 helps teachers raise the standards of their education. It includes new legal authority to help teachers eliminate bad behavior, tackle inefficiencies and improve how schools are held accountable. The provisions of Law are as follows:

1) Permit the search of students for dangerous or prohibited items without the school's consent.

2) Raise restrictions that prohibit schools from notifying students written birth without notice.

3) New advance notice Tax notice Student limitation Crime against teachers.

4) Authorization to facilitate free early childhood education for underprivileged children hardship 2 years old.

5) New school process reform and academy establishment Priority free schools.

6) Refocus Regular school assessment on the four key areas most important to parents.

7) Eligibility for schools to be exempted from regular Ofsted assessments Expand

8) New agency for underperforming schools including.

9) State minister's authority to close these schools.

10) Abolish five independent schools e existing agencies, some of their functions more efficient and report directly to the Secretary of State 44 44 Transferred to law enforcement.

**2.2.2 Functional Requirements**

A functional requirement is a definition of behavior between inputs and outputs that describes a function of a system or its component. Calculations, technical details, data manipulation, processing, and other specific functionality that define what a system is expected to perform are examples of functional requirements. Behavioral requirements are used to describe all of the scenarios in which the system applies the functional requirements, which are represented in use cases.

**2.2.2.1.1 Records Management Systems**

A records management system manages the administration of records for an organization throughout the records-life cycle. This facilitates the methodical and efficient management of record deletion, deletion, and related business transactions. It is a precise, simple, and safe system that includes features such as monitoring and updating student records. The various records management systems are listed below.

* **Student Records managements**

1. All information about the students is recorded in an organized manner in this management.
2. With just a few clicks, users may locate and retrieve student information.
3. Students can manage their personal information in Student Records, and academic and administrative staff can view student information and perform student administration tasks.

The student records operation list is provided below.

|  |  |  |  |
| --- | --- | --- | --- |
| Operation | Admins | Staff | Student |
| Create | Create a new record | No access | No access |
| Amend | Add a record to the achieve list | No access | No access |
| Archive | Transfer a record to the achieve | No access | No access |
| Display | Displays a list of all records, with all information displayed when an item is clicked | Students name and contact details are visible. | They can see their own name and rank. |
| Assign | Assign a course to a student | No access | No access |

**2.1.3.1.2 Student Records/Information Portal**

## Student Records are records, files, documents, and other materials maintained by a university or college that contain information directly related to students and are accessible to other professional personnel to aid in the instruction, guidance, and educational advancement of student.

The technical requirements for the Student Records/Information Portal are shown below.

|  |  |
| --- | --- |
| Requirements | Description |
| Home /login page | This page will contain a login portal requiring username and password. |
| Student Information page | This page will contains detail information of student. |
| Course | This page will display all courses and view Module content, Reading and resources, About module, Module activities and Assignment work. |
| Messages page | Through this page student direct message to the course module regarding the problem faced in course or assignment work. |
| Mark/Grade | This page will display grade of current courses. |
| Report | This page will contains detail report information of student performance and activities regarding assignment work and other. |
| About us | Woodlands University College’s details, description and history will be found in this page. |
| Sign out | Clicking the bottom of sign out portal. |

**2.2.3 Performance Requirements**

## Performance requirements are usually a set of criteria that specify how things should perform or the standards that they must meet under certain conditions. This differs from prescriptive requirements, which explain exactly how something should be done.

## Briefing documentation, performance-based specifications, output-based specifications, legislation, and so on may all contain performance criteria.

## 2.2.3.1 Records Management

## The supervision and administration of digital or paper records, regardless of format, is known as records management (RM). The creation, receiving, maintenance, usage, and disposal of records are all part of records management.

## 2.2.3.1.1 Speed

The following are some major characteristics that influence the speed of our system:

The time it takes to process a batch of records is known as throughput. At any given time, this system can process a hundred thousand records.

In a data or record management system, optimal speed means that records are processed quickly, efficiently, and smoothly.

**2.2.3.1.2 Capacity**

The capacity of the record management system refers to the amount of workload that the system can handle without causing strain or damage to the system.

It displays the amount of data that can be stored in this system as well as the number of operations that can be performed concurrently.

a. The maximum number of records that the system can store. This system has a storage capacity of 50 TB.

b. The total number of target users who can simultaneously access the online system. This system can support up to 100 concurrent users.

**2.2.3.1.3 Reliability**

A reliable record is one whose contents may be relied upon in the course of later transactions or activities as a complete and accurate portrayal of the transactions, activities, or facts to which they witness.

The most important requirement for any record management system to function in the future is the dependability of its data management system. It should be efficient and maintain a constant level of performance under pressure.

**2.2.3.1.4 Usability**

The record management system must be simple to operate. It should not take a large amount of labor to operate, and the system's operation should not be overly complicated or require extensive training. It is the rate at which users are able to understand this system, which includes data recording, update, insert, delete, and system backup.

It is possible to locate, retrieve, present, and understand a usable record.

**2.2.3.1.5 Accessibility**

The capacity to use and benefit from a system or entity is referred to as accessibility. Access controls the complete information lifecycle, allowing you to keep track of your entire application. Information that is easily accessible, regardless of its shape, structure, or presentation.

**2.2.3.2 Student Records/Information Portal**

* + - * 1. **Speed**

Different factors influence the speed of the student/information portal. Due to the various areas on the student/information portal, such as the login page, message page, information page, and others, processing takes time depending on the number of users. For example, if there are only 1 or 2 users, the average login time is only 30-40 seconds.

It may take roughly 10-15 seconds if the number of connection requests does not reach 100 because the server is likely busy, and it will only take a few seconds if there are just one or two users.

* + - * 1. **Capacity**

The total number of students accessing the student portal and the student portal reaction, i.e. the speed with which the student portal responds as the number of students grows. A student portal's capacity is determined by two factors: the number of students and the rise in material. As the number of users grows, the server may lag, hang, or slow down.

* + - * 1. **Reliability**

Student portal reliability is a quality that functions consistently and dependably. Out of a total of 730 hours per month, our student portal system will be operational for 700 hours. Our student portal has a backup plan and strategy in place in case of system failure. We have to configure a physical network for the backup plan, as well as install the student portal, backup, security, and storage policies, as well as their requirements.

* + - * 1. **Usability**

With basic knowledge and training, this decides how easy it is to use a student portal. There are various ways to assess your student portal's usability.

* Performance

The speed with which potential clients access the student portal determines its performance. The number of pupils and the substance of the page determine the speed. It takes around one minute to load a server if the number of students is larger than 100, and 3035 seconds to load a server if one student is greater than 100.

* Clear Navigation

We have a range of options to bring you to the desired page because our student portal is student-centric. For example, we can see a navigation bar on our page with login, information, course, mark/grade, report page, and so on. When a user clicks on that menu to see information about a certain student, it displays that student's details.

* + - * 1. **Accessibility**

It refers to the page where students enter their username and password to gain access to a learning organization's programs and other learning materials. Students can also use the student portal to tell Accessibility Services about future tests, quizzes, or examinations so that a place can be reserved for them.

After logging in, the Student Dashboard screen will appear, displaying your portal activities.

1. System Analysis and Design (Record Management System)

Here, the current system is analysed and with the help of the requirement specification that is created, better procedures and methods are designed to make the system more effective. Here, the system will implement the Business Object Notation (BON).

* 1. Preliminary Design Stages
     1. Textual Analysis

Textual analysis will model the possible classes of the system as well as the behaviours of those classes. This is done with the help of the documents provided and the necessary researches.

|  |  |
| --- | --- |
| Candidate Class | Class Responsibilities/Behaviours |
| Student | create\_student, amend\_student, archive\_student, display\_student, assign\_student |
| Staff | create\_staff, amend\_staff, archive\_staff, display\_staff,  assign\_staff |
| Course | create\_course\_structure, amend\_course, display\_course, delete\_course, assign\_course |
| Module | create\_module, amend\_module, delete\_module, archive\_module, display\_module, assign\_module |
| Assignment | create\_assignment, amend\_ assignment, delete\_ assignment, archive\_ assignment, display\_ assignment, assign\_ assignment, mark |
| Attendance | create\_attendance, amend\_ attendance, archive\_ attendance, monitor, display\_ attendance, action\_poor\_attendance |
| PersonalTutor | create\_tutor, amend\_tutor, assign\_tutor, display\_tutor |
| Timetable | create\_timetable, amend\_timetable, delete\_timetable, archive\_timetable, display\_timetable |
| Diary | create\_diary, amend\_diary, display\_diary, prompt\_diary, initiate\_automated\_action |
| Report | create\_report, display\_report, print\_report |

* + 1. Significant Event Analysis

Here, the possible classes in the system is identified with the help of significant events in the system. In other words, actions that will result to change in the system state.

|  |  |  |
| --- | --- | --- |
| Event | Performer | Candidate Attributes |
| Login to the system | Administrator | User Id  Password |
| Log out of the system | Administrator | - |
|  | | |
| Add student record | Administrator | Id  Full Name  Address  Contact  DOB  Course ID  Year  Information link |
| Update/Amend student record | Administrator |
| Archive student record | Administrator |
| View student record | Administrator, Student | Id |
| Assign student | Administrator |
|  | | |
| Add staff record | Administrator | Id  Full Name  Address  Contact  Module Id |
| Update/Amend staff record | Administrator |
| Archive staff record | Administrator |
| View staff record | Administrator, Staff | Id |
| Assign staff | Administrator |
|  | | |
| Add course structure | Administrator | Id  Course Name  Module Id |
| Update/Amend course | Administrator |
| Archive course | Administrator |
| View course | Administrator, Staff, Student | Id |
| Delete course | Administrator |
|  | | |
| Add module | Administrator | Id  Module Name  Staff Id |
| Update/Amend module | Administrator |
| Delete module | Administrator |
| Archive module | Administrator |
| View module | Administrator, Staff, Student |
| Assign module | Administrator |
|  | | |
| Add assignment | Administrator | Id  Assignment Name  Module Id  Initialized Date  Deadline  Information |
| Update/Amend Assignment | Administrator |
| Delete Assignment | Administrator |
| Archive Assignment | Administrator |
| View Assignment | Administrator, Staff, Student | Id |
| Assign assignment | Administrator, Staff | Id  Staff Id |
| Mark | Administrator, Staff | Id  Student Id |
|  | | |
| Generate attendance record | Administrator | Attendance percent  Student Id  Student Name  Year |
| Update/Amend attendance | Administrator, Staff |
| Archive attendance | Administrator |
| View attendance | Administrator, Staff |
| Action poor attendance | Administrator |
| Monitor | Administrator | - |
|  | | |
| Add personal tutor | Administrator | Staff Id  Module Id  Student Id |
| Update/Amend tutor | Administrator |
| View tutor | Administrator, Student |
| Assign tutor | Administrator | Staff Id  Student Id |
|  | | |
| Add timetable | Administrator | Course Id  Day  Time  Module Id |
| Update/Amend timetable | Administrator |
| Archive timetable | Administrator |
| Delete timetable | Administrator | Course Id |
| View timetable | Administrator, Staff, Student | Course Id |
|  | | |
| Generate report | Administrator | Staff Id  Student Id |
| View report | Administrator, Staff, Student |
| Print report | Administrator | - |
|  | | |
| Create diary | Administrator | Id  Message  Schedule  Pictures  Student Id |
| Update/Amend diary | Administrator, Staff |
| Prompt | Administrator |
| View diary | Administrator, Staff, Student | Id |
| Initiated Automated Action | Administrator |

* + 1. Commands, Queries and Constraints

**Login**

|  |  |  |  |
| --- | --- | --- | --- |
| CLASS | LOGIN | | PART 1/1 |
| TYPE OF OBJECT  A login object in the system. | | Author - Saurab Khadka  Created – 9 May, 2022 | |
| Queries | | User Id, Password, Status | |
| Commands | | Login | |
| Constraints | | * The user Id and password must be correct. * There is three possible user types: administrator, staff and student. | |

**Student**

|  |  |  |  |
| --- | --- | --- | --- |
| CLASS | STUDENT | | PART 1/1 |
| TYPE OF OBJECT  A student record object in the system. | | Author - Saurab Khadka  Created – 9 May, 2022 | |
| Queries | | Id, Full Name, Address, Contact, DOB, Year, Information link | |
| Commands | | Create, Amend, Archive, Display, Assign | |
| Constraints | | * Id must be unique. * DOB should of valid date. * Should not be able to enrol to more than one course. * Contact must be unique. * Administrator can access every command. * Student can only view his/her record. | |

**Staff**

|  |  |  |  |
| --- | --- | --- | --- |
| CLASS | STAFF | | PART 1/1 |
| TYPE OF OBJECT  A staff record object in the system. | | Author - Saurab Khadka  Created – 9 May, 2022 | |
| Queries | | Id, Full Name, Address, Contact | |
| Commands | | Create, Amend, Archive, Display, Assign | |
| Constraints | | * Id must be unique. * Contact must be unique. * Administrator can access every command. * Staff can only view their own record. | |

**Course**

|  |  |  |  |
| --- | --- | --- | --- |
| CLASS | COURSE | | PART 1/1 |
| TYPE OF OBJECT  A course record object in the system. | | Author - Saurab Khadka  Created – 9 May, 2022 | |
| Queries | | Id, Course Name | |
| Commands | | Create, Amend, Archive, Display, Delete | |
| Constraints | | * Id must be unique. * Administrator can access every command. * Staff and student can only view the course Id and name. | |

**Module**

|  |  |  |  |
| --- | --- | --- | --- |
| CLASS | MODULE | | PART 1/1 |
| TYPE OF OBJECT  A module management object in the system. | | Author - Saurab Khadka  Created – 9 May, 2022 | |
| Queries | | Id, Module Name | |
| Commands | | Create, Amend, Archive, Display, Delete | |
| Constraints | | * Id must be unique. * Administrator can access every command. * Staff and student can only view the module Id and name. | |

**Assignment**

|  |  |  |  |
| --- | --- | --- | --- |
| CLASS | ASSIGNMENT | | PART 1/1 |
| TYPE OF OBJECT  An assignment management object in the system. | | Author - Saurab Khadka  Created – 9 May, 2022 | |
| Queries | | Id, Assignment Name, Initialized date, Deadline, Information | |
| Commands | | Create, Amend, Archive, Display, Delete, Assign, Mark | |
| Constraints | | * Id must be unique. * Initialized date and deadline must be valid. * Administrator can access every command. * Staff can assign and mark. * Student can only view the assignment queries. | |

**Attendance**

|  |  |  |  |
| --- | --- | --- | --- |
| CLASS | ATTENDANCE | | PART 1/1 |
| TYPE OF OBJECT  An attendance record object in the system. | | Author - Saurab Khadka  Created – 9 May, 2022 | |
| Queries | | Attendance percent, Year | |
| Commands | | Create, Amend, Archive, Display, Monitor, Action Poor Attendance | |
| Constraints | | * Students with attendance percent less than 40% shall face appropriate actions. * Administrator can access every command. | |

**Personal Tutor**

|  |  |  |  |
| --- | --- | --- | --- |
| CLASS | PERSONAL\_TUTOR | | PART 1/1 |
| TYPE OF OBJECT  A personal tutor management object in the system. | | Author - Saurab Khadka  Created – 9 May, 2022 | |
| Queries | | Staff Id | |
| Commands | | Create, Amend, Assign, Display | |
| Constraints | | * Id must be unique. * Contact must be unique * Administrator can access every command. * Student can only view the personal tutor queries. | |

**Timetable**

|  |  |  |  |
| --- | --- | --- | --- |
| CLASS | TIMETABLE | | PART 1/1 |
| TYPE OF OBJECT  A timetable management object in the system. | | Author - Saurab Khadka  Created – 9 May, 2022 | |
| Queries | | Day, Time | |
| Commands | | Create, Amend, Archive, Display, Delete | |
| Constraints | | * Id must be unique. * Administrator can access every command. * Staff and student can only view the timetable. | |

**Report Generation**

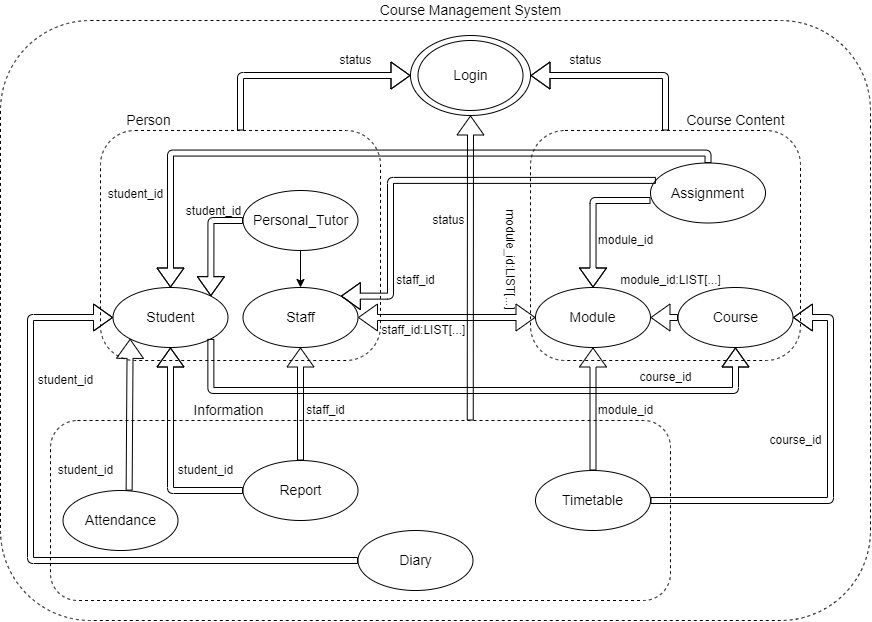
|  |  |  |  |
| --- | --- | --- | --- |
| CLASS | REPORT\_GENERATION | | PART 1/1 |
| TYPE OF OBJECT  A report generation object in the system. | | Author - Saurab Khadka  Created – 9 May, 2022 | |
| Queries | |  | |
| Commands | | Create, Display, Print | |
| Constraints | | * Administrator can access every command. * Staff and student can only view their own report. | |

**Diary**

|  |  |  |  |
| --- | --- | --- | --- |
| CLASS | DIARY | | PART 1/1 |
| TYPE OF OBJECT  A diary management object in the system. | | Author - Saurab Khadka  Created – 9 May, 2022 | |
| Queries | | Id, Message, Schedule, Pictures | |
| Commands | | Create, Amend, Display, Prompt, Initiate Automated Action. | |
| Constraints | | * Administrator can access every command. * Staff can update and view diary. * Student can only view the diary. | |

* 1. Detailed Static System Designs
     1. First Draft BON System Architecture Diagram

The diagram below is a draft of the system architecture made with the help of the Business Object Notation (BON).



BON System Architecture Diagram

* + 1. BON System Chart

|  |  |  |  |
| --- | --- | --- | --- |
| SYSTEM | COURSE MANAGEMENT SYSTEM | | PART 1/1 |
| PURPOSE  Develop an effective system for course management. | | Author - Saurab Khadka  Created – 10 May, 2022 | |
| Cluster | | Description | |
| Person | | Records data of people of different roles in the university along with corresponding access to make changes. | |
| Course Content | | Records the different courses available in the university along with more detailed information such as modules included and assignments assigned. | |
| Information | | Records data about the timetable, attendance, information diary as well generated report about staff and student. | |

* + 1. BON Cluster Charts

|  |  |  |  |
| --- | --- | --- | --- |
| CLUSTER | PERSON | | PART 1/1 |
| PURPOSE  Record data of people of different roles. | | Author - Saurab Khadka  Created – 10 May, 2022 | |
| Cluster Components | | Description | |
| STUDENT | | Records all the necessary data about students as well as makes changes in the records as necessary. | |
| STAFF | | Records all the necessary data about staff as well as makes changes in the records as necessary. | |
| PERSONAL\_TUTOR | | Records all the necessary data about personal tutors as well as makes changes in the records as necessary. | |

|  |  |  |  |
| --- | --- | --- | --- |
| CLUSTER | COURSE CONTENT | | PART 1/1 |
| PURPOSE  Record data of courses and other course details. | | Author - Saurab Khadka  Created – 10 May, 2022 | |
| Cluster Components | | Description | |
| COURSE | | Records all the information about the courses available in the university as well as makes in the records changes as necessary. | |
| MODULE | | Records all the about the modules taught in the university as well as makes changes in the records as necessary. | |
| PERSONAL\_TUTOR | | Records all the necessary data about personal tutors as well as makes changes in the records as necessary. | |

|  |  |  |  |
| --- | --- | --- | --- |
| CLUSTER | INFORMATION | | PART 1/1 |
| PURPOSE  Record data other important details such as schedule, attendance and so on. | | Author - Saurab Khadka  Created – 10 May, 2022 | |
| Cluster Components | | Description | |
| ATTENDANCE | | Records data about student’s attendance as well as makes changes in the records as necessary. | |
| TIMETABLE | | Records the timetable of the courses as well as makes changes in the records as necessary. | |
| REPORT | | Generates report about all the record of student and staff of the university. | |
| DIARY | | Keeps record of any necessary schedules or any other information provided to the students. | |

* + 1. BON Class Charts

|  |  |  |  |
| --- | --- | --- | --- |
| CLASS | LOGIN | | PART 1/1 |
| TYPE OF OBJECT  A login object in the system. | | Author – Saurab Khadka  Created – 9 May, 2022 | |
| Queries | | User Id, Password, Status | |
| Commands | | Login | |
| Constraints | | * The user Id and password must be correct. * There is three possible user types: administrator, staff and student. | |

|  |  |  |  |
| --- | --- | --- | --- |
| CLASS | STUDENT | | PART 1/1 |
| TYPE OF OBJECT  A student record object in the system. | | Cluster – Person  Created – 10 May, 2022 | |
| Queries | | Id, Full Name, Address, Contact, DOB, Year, Information link | |
| Commands | | Create, Amend, Archive, Display, Assign | |
| Constraints | | * Id must be unique. * DOB should of valid date. * Should not be able to enrol to more than one course. * Contact must be unique. * Administrator can access every command. * Student can only view his/her record. | |

|  |  |  |  |
| --- | --- | --- | --- |
| CLASS | STAFF | | PART 1/1 |
| TYPE OF OBJECT  A staff record object in the system. | | Cluster – Person  Created – 10 May, 2022 | |
| Queries | | Id, Full Name, Address, Contact | |
| Commands | | Create, Amend, Archive, Display, Assign | |
| Constraints | | * Id must be unique. * Contact must be unique. * Administrator can access every command. * Staff can only view their own record. | |

|  |  |  |  |
| --- | --- | --- | --- |
| CLASS | PERSONAL\_TUTOR | | PART 1/1 |
| TYPE OF OBJECT  A personal tutor management object in the system. | | Cluster – Person  Created – 10 May, 2022 | |
| Queries | | Staff Id | |
| Inherits from | | Staff | |
| Constraints | | * Id must be unique. * Contact must be unique * Administrator can access every command. * Student can only view the personal tutor queries. | |

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| --- | --- | --- | --- |
| CLASS | COURSE | | PART 1/1 |
| TYPE OF OBJECT  A course record object in the system. | | Cluster – Course Content  Created – 10 May, 2022 | |
| Queries | | Id, Course Name | |
| Commands | | Create, Amend, Archive, Display, Delete | |
| Constraints | | * Id must be unique. * Administrator can access every command. * Staff and student can only view the course Id and name. | |

|  |  |  |  |
| --- | --- | --- | --- |
| CLASS | MODULE | | PART 1/1 |
| TYPE OF OBJECT  A module management object in the system. | | Cluster – Course Content  Created – 10 May, 2022 | |
| Queries | | Id, Module Name | |
| Commands | | Create, Amend, Archive, Display, Delete | |
| Constraints | | * Id must be unique. * Administrator can access every command. * Staff and student can only view the module Id and name. | |

|  |  |  |  |
| --- | --- | --- | --- |
| CLASS | ASSIGNMENT | | PART 1/1 |
| TYPE OF OBJECT  An assignment management object in the system. | | Cluster – Course Content  Created – 10 May, 2022 | |
| Queries | | Id, Assignment Name, Initialized date, Deadline, Information | |
| Commands | | Create, Amend, Archive, Display, Delete, Assign, Mark | |
| Constraints | | * Id must be unique. * Initialized date and deadline must be valid. * Administrator can access every command. * Staff can assign and mark. * Student can only view the assignment queries. | |

|  |  |  |  |
| --- | --- | --- | --- |
| CLASS | ATTENDANCE | | PART 1/1 |
| TYPE OF OBJECT  An attendance record object in the system. | | Cluster – Information  Created – 10 May, 2022 | |
| Queries | | Attendance percent, Year | |
| Commands | | Create, Amend, Archive, Display, Monitor, Action Poor Attendance | |
| Constraints | | * Students with attendance percent less than 40% shall face appropriate actions. * Administrator can access every command. | |

|  |  |  |  |
| --- | --- | --- | --- |
| CLASS | TIMETABLE | | PART 1/1 |
| TYPE OF OBJECT  A timetable management object in the system. | | Cluster – Course Content  Created – 10 May, 2022 | |
| Queries | | Day, Time | |
| Commands | | Create, Amend, Archive, Display, Delete | |
| Constraints | | * Id must be unique. * Administrator can access every command. * Staff and student can only view the timetable. | |

|  |  |  |  |
| --- | --- | --- | --- |
| CLASS | REPORT\_GENERATION | | PART 1/1 |
| TYPE OF OBJECT  A report generation object in the system. | | Cluster – Course Content  Created – 10 May, 2022 | |
| Queries | |  | |
| Commands | | Create, Display, Print | |
| Constraints | | * Administrator can access every command. * Staff and student can only view their own report. | |

|  |  |  |  |
| --- | --- | --- | --- |
| CLASS | DIARY | | PART 1/1 |
| TYPE OF OBJECT  A diary management object in the system. | | Cluster – Course Content  Created – 10 May, 2022 | |
| Queries | | Id, Message, Schedule, Pictures | |
| Commands | | Create, Amend, Display, Prompt, Initiate Automated Action. | |
| Constraints | | * Administrator can access every command. * Staff can only update and view diary. * Student can only view the diary. | |

* 1. Detailed Dynamic System Designs
     1. Event Charts

The interaction between objects is caused due to the incoming events or external events in the system. In event charts, the interesting and representative enough events are listed along with the objects involved in those events.

|  |  |  |  |
| --- | --- | --- | --- |
| **EVENTS** | **STUDENT\_RECORD** | | **PART 1/1** |
| **COMMENT**  Selected incoming/external events triggering illustrative types of behaviour | | Created – 10 May, 2022 | |
| **External (Incoming)** | | **Involved Object Types** | |
| Request to login to the system. | | LOGIN | |
| Request to add a new student record | | STUDENT, COURSE | |
| Request to edit a student record | | STUDENT, COURSE | |
| Request to archive the student record | | STUDENT, COURSE | |
| Request to view the details of a student | | STUDENT, COURSE | |

* + 1. Object Creation Charts

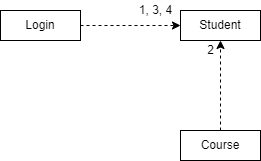
|  |  |  |  |
| --- | --- | --- | --- |
| **EVENTS** | **COURSE\_MANAGEMENT\_SYSTEM** | | **PART 1/1** |
| **COMMENT**  List of classes creating objects in the system. | | Created – 10 May, 2022 | |
| **Class** | | **Creates instances of** | |
| LOGIN | | - | |
| STUDENT | | COURSE | |
| STAFF | | MODULE | |
| COURSE | | MODULE | |
| MODULE | | STAFF | |
| ASSIGNMENT | | MODULE, STUDENT | |
| ATTENDANCE | | STUDENT | |
| PERSONAL\_TUTOR | | STAFF, STUDENT | |
| TIMETABLE | | COURSE, MODULE | |
| DIARY | | STUDENT, STAFF | |
| REPORT\_GENERATION | | STUDENT, STAFF | |

* + 1. System Scenario Charts

|  |  |  |  |
| --- | --- | --- | --- |
| **SCENARIOS** | **STUDENT\_RECORD** | | **PART 1/1** |
| **COMMENT**  Selected some fascinating scenarios to show important kinds of system behaviour. | | Created – 10 May, 2022 | |
| **Check if the Id and password is correct:**  After filling up the user Id and Password, these field are checked from the database. And if it is, logged into the system, if not, cannot login. | | | |
| **Create a student record:**  All the necessary field asked to store the data is to be filled properly. All the entered data is stored in the database. One field is taken from course class. | | | |
| **Edit the record just created:**  That particular record is chosen All the data recorded about that student is displayed and necessary updates are made and re-updated into the database. | | | |
| **Archive the created record:**  The record in the database is then archived along with all other records previously kept. | | | |
| **View the record:**  Record can be viewed from the database about that particular student chosen. Every details stored in that database is displayed. | | | |

* + 1. Dynamic Diagrams

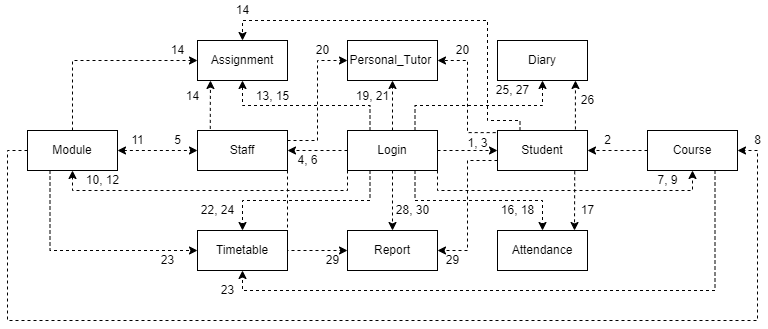
|  |
| --- |
| Scenario:   * + - 1. Open student record       2. Ask course id from course       3. Include course id in student record       4. Display student record |



BON Dynamic Diagram of Student record

Here is an overall scenario of the course management system as well as its dynamic diagram.

|  |
| --- |
| Scenario:   1. Log into the system and open student. 2. Access course Id from course. 3. Display student. 4. Check the staff. 5. Import module Id from module. 6. Display staff. 7. Open course. 8. Access module list. 9. Display course. 10. Open module. 11. Import staff Id from staff. 12. Display module. 13. Open assignment. 14. Access student Id, staff Id and module Id. 15. Display assignment. 16. Select attendance. 17. Obtain student Id. 18. Show attendance. 19. Open personal tutor. 20. Inherit from staff and import student Id. 21. Show tutor. 22. Check timetable. 23. Access course Id and module Id. 24. Show timetable. 25. Open diary. 26. Access student Id. 27. Display diary. 28. Select report generation. 29. Access student Id and staff Id. 30. Display report. |



BON Dynamic Diagram

* 1. System Database Design
  2. Detailed Dynamic System Designs

1. System Interface Design

4.1 Draft Interface Design (Record Management)

4.1.1 Wireframes

Below are the wireframes of the Record Management.

4.1.2 System Navigation Diagram (Record Management)

4.1.3 System Screen Mock-ups (Record Management)

|  |
| --- |
| Graphical user interface  Description automatically generated with medium confidence  Figure 2 Login Page of Record Management System |

|  |
| --- |
| Graphical user interface, application  Description automatically generated  Figure 3 Non enrolled Section of Record Management System |

|  |
| --- |
| Graphical user interface, application  Description automatically generated  Figure 4 Enrolled Section of Student in Record Management System |

|  |
| --- |
| A picture containing graphical user interface  Description automatically generated  Figure 5 Archived Student Date in Record Management System |

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| Graphical user interface, application, Teams  Description automatically generated  Figure 6 Create Student data in Record Management System |

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| --- |
| Graphical user interface, application, Teams  Description automatically generated  Figure 7 Update Student Data in Record Management System |

|  |
| --- |
| A screenshot of a computer  Description automatically generated with medium confidence  Figure 8 Staff Data in Record Management System |

|  |
| --- |
| A picture containing graphical user interface  Description automatically generated  Figure 9 Archived Staff Date in Record Management System |

|  |
| --- |
| Graphical user interface, application, Teams  Description automatically generated  Figure 10 Update Staff Record in Record Management System |

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| --- |
| A screenshot of a computer  Description automatically generated with medium confidence  Figure 11 Course Section in Record Management System |

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| A picture containing graphical user interface  Description automatically generated  Figure 12Archived Course in Record Management System |

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| Graphical user interface, application, Teams  Description automatically generated  Figure 13 Create Course Sturcture in Record Management System |

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| --- |
| Graphical user interface, application, Teams  Description automatically generated  Figure 14 Update Course Structure in Record Management System |

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| A screenshot of a computer  Description automatically generated with medium confidence  Figure 15 Module Section in Record Management System |

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| Graphical user interface  Description automatically generated with low confidence  Figure 16 Archived Module data in Record Management System |

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| --- |
| A picture containing shape  Description automatically generated  Figure 17 Create Module record in Record Management System |

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| Shape  Description automatically generated with low confidence  Figure 18 Update Module Record in Record Management System |

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| A screenshot of a computer  Description automatically generated with medium confidence  Figure 19 Assignment Section in Record Management System |

|  |
| --- |
| A screenshot of a computer  Description automatically generated with medium confidence  Figure 20 Assignment Section when clicked in particular Assignment |

|  |
| --- |
| Graphical user interface, application, Teams  Description automatically generated  Figure 21 Assign Assignment in Record Management System |

|  |
| --- |
| Graphical user interface, application  Description automatically generated  Figure 22 Mark Student Submitted Assignment in Record Management System |

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| --- |
| A picture containing graphical user interface  Description automatically generated  Figure 23 Archived Assignment in Record Management System |

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| --- |
| Graphical user interface, text, application, chat or text message  Description automatically generated  Figure 24 Attendance Section in Record Management System |

|  |
| --- |
| A picture containing graphical user interface  Description automatically generated  Figure 25 Archived Attendance in Record Management System |

|  |
| --- |
| Graphical user interface, application, Teams  Description automatically generated  Figure 26 Create Attendance Sheet section in Record Management System |

|  |
| --- |
| Graphical user interface, application, Teams  Description automatically generated  Figure 27 Update Attendance Sheet in Record Management System |

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| --- |
| A picture containing table  Description automatically generated  Figure 28 Take Attendance Sheet in Record Management System |

|  |
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| A screenshot of a computer  Description automatically generated with medium confidence  Figure 29 Personal Tutor Section in Record Management System |

|  |
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| A picture containing graphical user interface  Description automatically generated  Figure 30 Archived Personal Tutor in Record Management System |

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| --- |
| Graphical user interface, application, Teams  Description automatically generated  Figure 31 Edit Personal Tutor Section in Record Management System |

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| --- |
| Table  Description automatically generated  Figure 32 Assign Personal Tutor to Student Section in Record Management System |

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| A screenshot of a computer  Description automatically generated with medium confidence  Figure 33 Timetable Section in Record Management System |

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| A picture containing graphical user interface  Description automatically generated  Figure 34 Archived Timetable in Record Management System |

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| Table  Description automatically generated  Figure 35 Create Timetable Section in Record Management System |

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| --- |
| Table  Description automatically generated  Figure 36 Update Timetable Section in Record Management System |

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| --- |
| Graphical user interface, application  Description automatically generated  Figure 37 Diary Section in Record Management System |

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| --- |
| A picture containing graphical user interface  Description automatically generated  Figure 38 Archived Diaries in Record Management System |

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| --- |
| Graphical user interface, application, Teams  Description automatically generated  Figure 39 Create Diary Section in Record Management System |

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| --- |
| Graphical user interface, application, Teams  Description automatically generated  Figure 40 Update Diary in Record Management System |

|  |
| --- |
| Diagram  Description automatically generated  Figure 41 Generate Report Section in Record Management System |

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| --- |
| Shape, rectangle  Description automatically generated  Figure 42 View Report Section in Record Management System |

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4.1.4 System Activity Event Diagram (Record Management)

4.2 Design Revisions (Record Management)

The design above presented are the belonging of the Record Management.

4.3 Heuristic Evaluation (Records Management)

4.4 Draft Interface Design (Student Record/Information Portal)

4.4.1 Wireframes

Below are the wireframes of the Student Record/Information Portal.

4.4.2 System Navigation Diagram (Student Record/Information Portal)

4.4.3 System Screen Mock-ups (Student Record/Information Portal)

|  |
| --- |
| Graphical user interface  Description automatically generated  Figure 43 Courses section in Student Portal |

|  |
| --- |
| Graphical user interface  Description automatically generated with medium confidence  Figure 44 Module Section in Student Portal |

|  |
| --- |
| Graphical user interface, application  Description automatically generated  Figure 45 Module Material Section in Student Portal |

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| --- |
| Graphical user interface  Description automatically generated  Figure 46 Assignment Section in Student Portal |

|  |
| --- |
| Graphical user interface, text, application  Description automatically generated  Figure 47 Submit Assignment Section in Student Portal |

|  |
| --- |
| Graphical user interface, application  Description automatically generated  Figure 48 Personal Tutor Section in Student Portal |

|  |
| --- |
| Text  Description automatically generated  Figure 49 TimeTable Section in Student Portal |

|  |
| --- |
| Graphical user interface, text  Description automatically generated with medium confidence  Figure 50 Diary Section in Student Portal |

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4.4.4 System Activity Event Diagram (Student Record/Information Portal)

4.5 Design Revisions (Student Record/Information Portal)

The design above presented are the belonging of the Record Management

4.6 Heuristic Evaluation (Student Record/Information Portal)