



U N I V E R S I T Y O F
L I V E R P O O L

StudentRecruiter System

Requirements Specification Document

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Figure I: Use case diagram

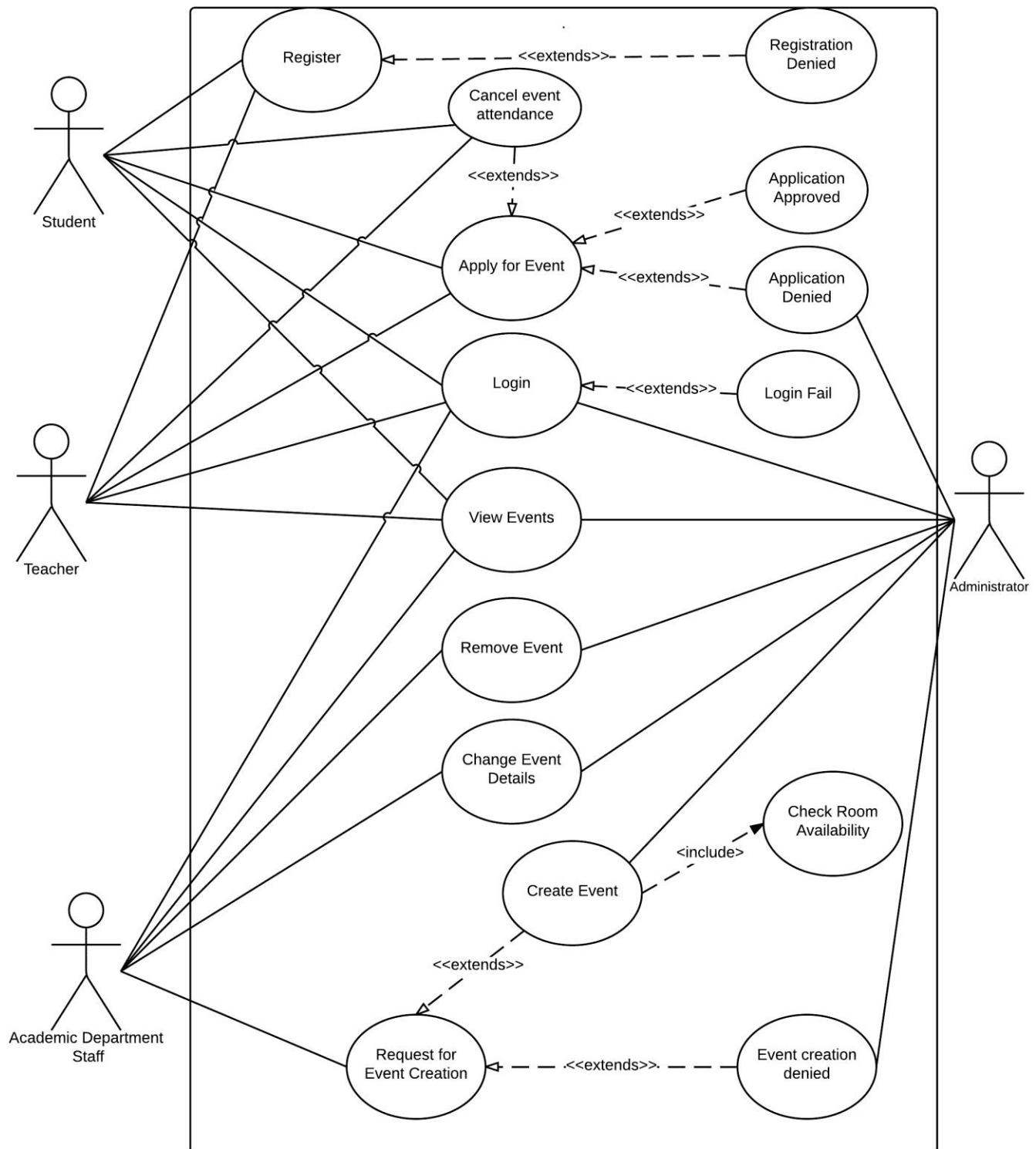
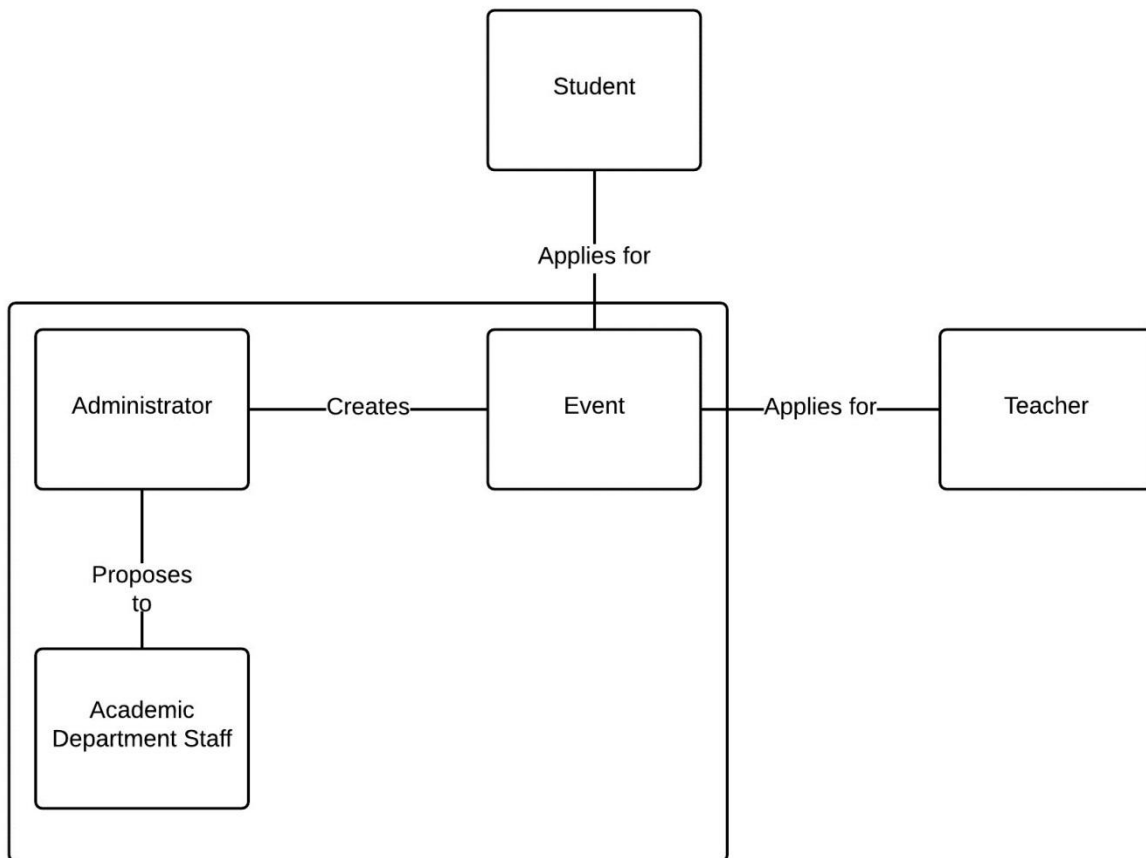


Figure II: System boundary diagram



1. Introduction

1.1 Purpose

This project is concerned with developing the *StudentRecruiter* System (SRS). This system is designed for universities who need to manage visits from schools and students to their campus.

The stakeholders involved include: University Administrators, Academic Departments, Students, and Teachers.

The SRS will provide facilities to enable the co-ordination of events organised by Academic Departments, from general university open days, large introductory sessions, individual department visits, and career services, to receptions, public lectures, speeches, and concerts. Centralising the organisation of all university events into a single system will make it easier for the university to manage and track what is happening on campus. It will also make it easier for prospective Students and Teachers who wish to attend events.

1.2 Scope

The SRS will assist departments within universities to organise and communicate event information to schools and students who wish to visit.

The SRS will improve communication processes between the university and visitors by completely replacing unnecessary paperwork and emails (such as application forms, events listings, promotions) with a single destination for all stakeholders to perform all their transactions.

Informational consistency (between the university administrators, who are overseeing the activity on campus, and the academic departments, who are organising the events themselves) will be improved as they will be accessing the same set of data.

The SRS will also make all the processes of holding and applying to attend an event much quicker by automating services, for example, checking if there is enough capacity in a room to accept an application for event attendance (and then checking if the event can be moved to a larger room if not).

1.3 Document overview

This document provides a high-level description of the SRS that is accessible to all the involved stakeholders of the system.

A general description (p. 7) of the SRS establishes the mission statement, mission objectives, system specifications, general hardware-software constraints, and assumed characteristics of each of the four users.

A list of user views (p.11) describing the services that should be available to each user is specified.

A master list of the SRS' 15 requirements (p.13) is presented followed by expository details of each requirement which include input, display and system processing (transaction) descriptions.

Finally, the expected conduct of the entire project (p.20) has also been specified accompanied by a Gantt chart and risk assessment.

1.4 Definitions

SRS - *StudentRecruiter* System

2. General description

2.1. Mission statement

To manage the organisation of visits by schools and students to university open days and events.

2.2. Mission objectives

To register for an account
To login onto the system
To maintain event information
To maintain student information
To maintain teacher information
To maintain departmental information
To review requests to change events
To cancel an event
To reject an event application
To approve an event application
To view available events on calendar
To perform searches on available events on calendar
To perform searches on Academic Departments
To perform searches on Students and Teachers
To perform searches on event attendees
To check room availability
To apply for a listed event
To cancel event attendance
To report on Students
To report on Teachers
To report on Academic Departments
To report on events
To report on user registrations
To report on attend event applications
To report on new event creation requests
To report on event attendees
To report on attending events

2.3. System specifications

2.3.1. Scalability

- Initial Database Size: The initial database will only contain the records of Academic Departments, room details (location, capacity, equipment), Teachers, staff from Academic Departments and University Administrators. The estimated initial database size will not exceed 20MB.
- Expected Rate of Growth: As University Administrators create new events, and Teachers and Students register on the system, the database is expected to have a moderate rate of growth. The expected rate of growth is estimated at 80MB per month. The system shall be able to store data for at least 5 years under normal usage.

The system only requires a limited scalability. The system should be redesigned in order to scale up for handling larger databases.

2.3.2. Server requirements

2.3.2.1. Hardware and operating system

The system should be able to run on major 64-bit Linux distributions with a minimum of:

- 1GB+ memory
- 100GB+ hard disk
- 2GHz dual-core or better CPU

2.3.2.2. Network

The server should have at least 100M bandwidth for both inbound and outbound traffic. It should have low latencies to major ISPs.

2.3.2.3. Performance

The server shall be able to:

- Process a general incoming request in 50ms
- Process a search query in 1s

2.3.3. Client requirements

2.3.3.1. Hardware and operating system

The system will support any computers running Windows / Mac / Linux operating systems with Java installed.

The client program will be run on Java v1.8.0 or later.

2.3.3.2. Network

An internet connection is required for this system to function. The client should have at least a bandwidth of 2M for it to be run normally.

2.3.4. Security

- For transmitting sensitive information, user contacts and login credentials on the Internet, asymmetric encryption protocols such as Secure Sockets Layer (SSL) will be used
- User password will not be stored as plaintext in the database (encrypted)

2.3.5. Backup and migration

- The system should be able to restore from failure using backup files
- The database should easily be able to migrate from MySQL to MS-SQL or Oracle Database

2.4. General constraints

2.4.1. Software limitations

- The system will require a Windows 2000 (or greater), Mac OS X, or Linux operating system.
- Eclipse and plain text editors will be used to develop the system.

2.4.2. Hardware limitations

- Users will require a computer that can run Windows 2000 (or greater), Mac OS X, or Linux operating system.
- The database used in the system will be stored on a Linux server using MySQL.
- All machines will need to be networked together in order to access the database.

2.4.3. User limitations

- Only teachers from approved schools will be able to use the system.
- Only students from approved schools will be able to use the system.

2.5. User characteristics

2.5.1. University Administrator

Size of user group	Administrative staff from the University of Liverpool who are responsible for the co-ordination of events (5 people)
Age range	21+
Gender	Estimated equally mixed male and female
Language	English as main language. May be some variants.
Education / Qualifications	High level of experience with productivity software.
Physical limitations	Full range. Includes people with physical / visual handicaps.
Special skills	Administrative users will have a good knowledge of the system and have sufficient IT skills to operate it efficiently.
Potential user requirements	Deals with a large amount of information so needs to be able to make many requests- pages should load within 2s.

2.5.2. Academic Department

Size of user group	Five departments from Liverpool University represented on the system. One staff member from each department (5 people)
Age range	21+
Gender	Estimated equally mixed male and female
Language	English as main language. May be some variants.
Education / Qualifications	High level of experience with productivity software.
Physical limitations	Full range. Includes people with physical / visual handicaps.
Special skills	Departmental users will have a good knowledge of the system and have sufficient IT skills to operate it efficiently
Potential user requirements	Needs to be able to change event information easily.

2.5.3. Student

Size of user group	All students from registered and approved secondary schools and colleges in the UK.
Age range	Schools: 11 – 18, Colleges: 16+
Gender	Estimated equally mixed male and female
Language	English as main language. May be some variants.
Education / Qualifications	Variation: from secondary school to pre-university level.
Physical limitations	Full range. Includes people with physical / visual handicaps.
Special skills	Assumed to have some low or basic IT skills.
Potential user requirements	Design system to be easy to use, clear, and understandable, allowing students of all ages to navigate it easily - use dropdown menus, dialog boxes, and help screens to guide user. For students with visual impairments, use audio aids.

2.5.4. Teacher

Size of user group	All teachers from registered and approved schools in the UK.
Age range	21+
Gender	Estimated equally mixed male and female
Language	English as main language. May be some variants.
Education / Qualifications	Teachers assumed to have university degrees. High level of experience with productivity software.
Physical limitations	Full range. Includes people with physical / visual handicaps.
Special skills	Assumed to have some general IT skills.
Potential user requirements	Teacher acts on behalf of group - needs to be able to easily make changes to an event application if circumstances change.

3. User views

3.1. University Administrator

- To register for an account
- To login onto the system
- To maintain event information
- To maintain student information
- To maintain teacher information
- To maintain departmental information
- To review requests to change events
- To cancel an event
- To reject an event application
- To approve an event application
- To view available events on calendar
- To perform searches on available events on calendar
- To perform searches on Academic Departments
- To perform searches on Students and Teachers
- To perform searches on event attendees
- To report on all Students
- To report on all Teachers
- To report on all Academic Departments
- To report on all events
- To report on all user registrations
- To report on all event applications
- To report on all new event creation requests
- To report on all event attendees
- To check room availability

3.2. Academic Department

- To register for an account
- To login onto the system
- To maintain department information
- To maintain event information
- To cancel an event
- To view available events on calendar
- To perform searches search for available events on calendar
- To login onto the system
- To request for an event to be created
- To report on all given event creation requests
- To report on all given event attendees
- To report on Academic Department

3.3. Teacher

- To register for an account
- To login onto the system
- To maintain teacher information
- To view available events on calendar
- To perform searches search for available events on calendar
- To apply for a listed event
- To cancel event attendance
- To report on given user registration
- To report on all given attend event applications
- To report on all given attending events
- To report on all available events

3.4. Student

- To register for an account
- To login onto the system
- To maintain student information
- To view available events on calendar
- To perform searches search for available events on calendar
- To apply for a listed event
- To cancel event attendance
- To report on given user registration
- To report on all given attend event applications
- To report on all given attending events
- To report on all available events

4. Requirements

4.1. Requirements master list

- REQ1:** Register—*Users register for an account*
- REQ2:** Login—*Users login to use the system*
- REQ3:** Registration denied (*extends REQ1*) —*Reject registration application from an unidentified school*
- REQ4:** Login unsuccessful (*extends REQ2*) —*User's login attempt was unsuccessful*
- REQ5:** View events—*View available university events*
- REQ6:** Apply for event—*Apply to a university event*
- REQ7:** Event application approved (*extends REQ6*) —*Approve event application from a large group*
- REQ8:** Event application denied (*extends REQ6*) — *Reject event application from a large group*
- REQ9:** Cancel event attendance (*extends REQ6*) —*User cancels their attendance at an event*
- REQ10:** Request new event—*Academic Department requests University Administrator to create an event*
- REQ11:** New Event request denied (*extends REQ10*)—*Reject new event request*
- REQ12:** Create event (*extends REQ10, includes REQ13*)—*Approve new event request, create new event*
- REQ13:** Check room availability—*When creating new event, check timetable for room availability*
- REQ14:** Change event details—*Event organiser updates event details*
- REQ15:** Remove event—*University Administrator or Academic Department cancels an event that has been created*

4.2. Requirements descriptions

Each description is set out as follows:

- a) Description: a description of the action
- b) Input: what the user should do during the action
- c) Display: what the system should output to the user once this input has been received
- d) System processing: how this action transacts with the system's database

4.2.1. REQ1: Register

4.2.1.a. Description

Users register for an account.

4.2.1.b. Input

When registering for an account, users will input their details using a form provided on the system.

4.2.1.c. Display

Users will use a registration option found on the home screen of the system. This will then take them to the registration page where they can enter their details. A register button will be visible, prompting the user to finalise registration.

4.2.1.d. System processing

The system will store all the input information in our database. The system will generate an account number and username for the user and generate an email sending the user their private information.

4.2.2. REQ2: Login

4.2.2.a. Description

Users login to use the system.

4.2.2.b. Input

Username and password entered by user into appropriate fields on log in screen. Both username and password will be a sequence of characters, letters or numbers. The system will recognise each type of user via their particular type of username.

4.2.2.c. Display

Successful leads to system main page. Unsuccessful login stays on the login page.

4.2.2.d. System processing

The system will match the username and password entered by the user to verify the user. This is done by searching the database and checking that the password is correctly matched to the entered user name.

4.2.3. REQ3: Registration denied (extends REQ1)

4.2.3.a. Description

Each different type of user will have a unique identifier that will enable the system to verify that account. For example – student – student number, school – school code etc. if an incorrect value is entered the account will not be authorised and registration will be denied.

4.2.3.b. Input

If the user inputs incorrect values in their specific fields (the fields the system uses to verify accounts). Input will be a school code or student code or staff number (to be decided in design).

4.2.3.c. Display

The system will display an error message informing the user that they haven't entered valid data in that field. The display will highlight the appropriate field, prompting the user to re-enter

4.2.3.d. System processing

The system will check the user's entered codes using string comparison techniques. This processing will be done when the user hits the register button.

4.2.4. REQ4: Login unsuccessful (extends REQ2)

4.2.4.a. Description

Users entering incorrect details into the system, either both or one of (username and password), causes the log in to be unsuccessful.

4.2.4.b. Input

Incorrect username or incorrect password entered (REQ2).

4.2.4.c. Display

The original log in screen will be shown until the authorisation fails which will trigger the display to provide an error message to the user informing them to retry their password or username. The username and password fields will clear allowing the user to re-enter.

4.2.4.d. System processing

The system will have queried the database in order to compare passwords and authorise users. When this fails the system will count the number of times a user fails to log in and will lock the users account and send an email after the fifth attempt. The only extra processing done during a failed log in attempt is a method call to produce an error message on the log in screen

4.2.5. REQ5: View events

4.2.5.a. Description

Users will have the ability to view available events on a calendar. Users can search for events and filter the results. Users will also be able to view events they have applied for.

4.2.5.b. Input

To search for an event, the user will enter a search term into the search bar. The user will also be able to use drop down menus to specify events.

Events can be searched for by text input. Events can be filtered (by date, type, demographic, department) to specify what events should be displayed.

4.2.5.c. Display

The system will display a calendar alongside a list of events for a selected week. The user can click a date on the calendar which will update the list of events for that week. A search bar and search options such as drop down menus will be provided at the top of the interface for the user to refine their requests.

To view a user's booked events, they will click a button that will lead to a page with a list of the events they have booked.

Clicking on an event will lead to the event's page which will display further information such as a full event description, accessibility information, location on a map.

4.2.5.d. System processing

Each view request is a query on the database of events. Data is fetched and formatted for display to the user.

4.2.6. REQ6: Apply for event

4.2.6.a. Description

Student and Teacher users will be able to apply for an event that is listed on the events calendar.

4.2.6.b. Input

Users will press a button on the event's page to apply for an event.

4.2.6.c. Display

A message confirming the event application should be displayed to the user. Each new application would appear as an alert to the University Administrator. If the application is provisionally suitable (does not exceed remaining capacity), then a message asking the University Administrator to approve the application will be displayed. If the application exceeds the event's current allocated room capacity, a message asking the University Administrator to change the event's room or to deny the application will be displayed.

4.2.6.d. System processing

This will alert the University Administrator in order that the suitability of the application (room capacity, correct demographic) can be assessed and the application confirmed.

The system will check whether the number of people in the application does not exceed the remaining capacity (room capacity minus already approved visitors).

4.2.7. REQ7: Event application approved (extends REQ6)

4.2.7.a. Description

University Administrator will have the ability to approve an event application from Teacher.

4.2.7.b. Input

University Administrator will approve a user's event application by clicking a button and entering a reason for the event's denial.

4.2.7.c. Display

A popup message alerting the Teacher of the successful event application will be displayed.

4.2.7.d. System processing

Event application is deleted from the database.

4.2.8. REQ8: Event application denied (extends REQ6)

4.2.8.a. Description

University Administrator will have the ability to deny an event application from Teacher.

4.2.8.b. Input

University Administrator will deny a user's event application by clicking a button and entering a reason for the event's denial.

4.2.8.c. Display

A popup message alerting the Teacher of the unsuccessful event application with the reason will be displayed.

4.2.8.d. System processing

Event tuple is updated with new attendants.

4.2.9. REQ9: Cancel event attendance (extends REQ6)

4.2.9.a. Description

A Student or Teacher who has applied to an event can cancel their event attendance.

4.2.9.b. Input

On the page of the event that the user has applied to attend, there will be a cancel button which the user can press in order to cancel the attendance.

4.2.9.c. Display

Upon cancelling an event, the user will be notified about the successful cancellation with a popup message.

4.2.9.d. System processing

The system will update the event tuple to the new expected attendance number and the user tuple will delete the event code.

4.2.10. REQ10: Request new event

4.2.10.a. Description

Academic Department can propose for an event to be created by providing a description and date that they wish to hold the event.

4.2.10.b. Input

Academic Department can click on a button to bring up the event request page. They can then either submit the request or cancel.

4.2.10.c. Display

The event proposal form will consist of spaces to input title, content, and date of event.

4.2.10.d. System processing

When the University Administrator confirms an event request, the system creates a new tuple containing the contents of the request and adds it to the event request.

4.2.11. REQ11: New event request denied (extends REQ10)

4.2.11 a. Description

University Administrator is able to deny an event creation request created by an academic department staff.

4.2.11 b. Input

Click on the deny button next to a new request.

4.2.11 c. Display

When the deny process goes through to the system, the admin gets a confirmation of the denial and the relevant academic department staff are also notified that their event has not been approved.

4.2.11 d. System processing

System deletes the selected tuple from the event request table.

4.2.12. REQ12: Create event (extends REQ10, includes REQ13)

4.2.12 a. Description

When the University Administrator sees that there is a request for an event to be created (from an Academic Department), they are able to create the requested event given that there is a room available to host that event.

4.2.12 b. Input

University Administrator checks room to hold event and presses a button to confirm event creation at the selected location.

4.2.12 c. Display

University Administrator can see a list of event requests, and a list of available rooms, and can create links.

4.2.12 d. System processing

When an event is created, the system creates a new tuple in the event table with info of the event contents as well as the location.

4.2.13.REQ13: Check room availability

4.2.13 a. Description

University Administrator is able to view all rooms and see if they are available for event booking.

4.2.13 b. Input

University Administrator is able to click on rooms in a table format.

4.2.13 c. Display

Rooms are presented in a table format and University Administrator is able to see detailed info on location and what equipment the room contains (such as projectors, computers etc.) by clicking on each room.

4.2.13 d. System processing

A query is sent to the room record in the database and the relevant data is retrieved for the user to view.

4.2.14.REQ14: Change event details

4.2.14 a. Description

University Administrator and Academic Department can change the details of an event.

4.2.14 b. Input

User selects event whose details are to be changed. User enters updated details

4.2.14 c. Display

Events calendar is updated with new details. Relevant Academic Departments and University Administrators will be notified of the change. Students and Teachers who have confirmed attendances at a changed event will be notified of changes by email.

4.2.14 d. System processing

The system will first retrieve the event detail from the database and then update it. It will then retrieve the list of users subscribed to this event and generate email notifications to alert them of changes.

4.2.15.REQ15: Remove event

4.2.15 a. Description

University Administrator or Academic Department can cancel an event that has been created.

4.2.15 b. Input

Clicking a button and then clicking on a confirmation button will allow the University Administrator or Academic Department to cancel the selected event.

4.2.15.c. Display

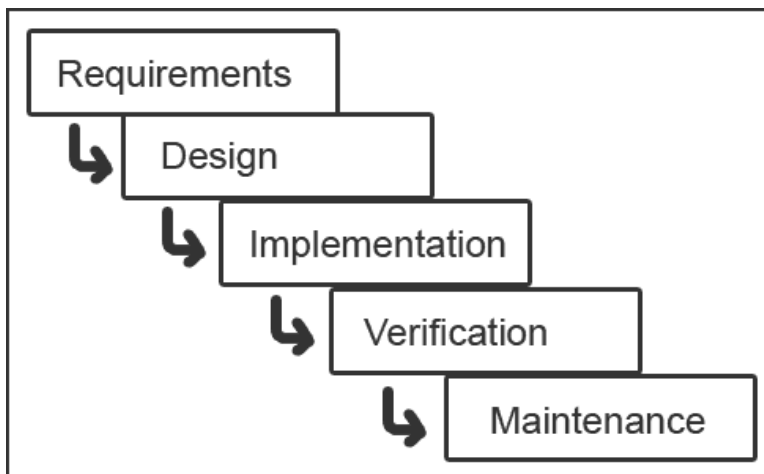
Cancelling an event will show a cancellation confirmation message to the user as well as to any University Administrator or Academic Department who were involved in creating the event, and email notifications will be to any Teacher or Student who had applied to attend the event.

4.2.15.d. System processing

The system will delete the selected tuple from the event table. The room linked to the event will also be shown as available. It will then retrieve the list of users subscribed to this event and generate email notifications to alert them of changes.

5. Planning

5.1. Waterfall model



We will be following the waterfall model of software development.

5.2. Project schedule

Week 1 (commencing 2nd February)

Planning

Week 2 (commencing 9th February)

Planning

Research

Requirements

Use case diagram – Minhyung

System boundary diagram – Minhyung

Introduction (purpose, scope) – Mohamed

User views – Tom

User characteristics – Tom

General specification – Tom

System specification – Rihan

Mission objectives – Alex

Requirements master list – Alex
Requirements descriptions – Minhyung, Rihan, Alex, Tom

Week 3 (*commencing 16th February*)

Requirements
Planning – Minhyung, Rihan, Alex
Gantt chart – Alex
Risk assessment – Minhyung
Contingency plan – Alex
Bibliography – Alex

Final requirements document – Alex (*by 20th February*)

Prepare requirements presentation for next week

Week 4 (*commencing 23rd February*)

Requirements presentation (27th February)

Introduction – Mohamed
System specifications – Rihan
User characteristics – Tom
User requirements – Minhyung
Questions, comments – Alex

Week 5 (*commencing 2nd March*)

Design
System architecture, components design – Minhyung, Rihan
Data structures – Minhyung, Rihan
Algorithm design – Alex, Rihan
Interface design – Tom, Mohamed

Week 6 (*commencing 9th March*)

Design
Pseudo code – All
ER database model – Minhyung, Rihan
Class diagram – Alex, Rihan
User interface – Tom, Mohamed

Week 7 (*commencing 16th March*)

Design
Logical, physical table structures – Minhyung, Rihan, Alex
Evaluation design – Rihan, Mohamed, Tom

Final design document – Alex (*due 20th March*)

Prepare design presentation for next week

Week 8 (*commencing 23rd March*)

Design Presentation (27th March)

Week 9 (*commencing 20th April*)

Implementation
SQL database – All
Server – Rihan, Minhyung

GUI – Alex, Mohamed
Classes–Minhyung, Tom

Week 10 (*commencing 27th April*)
Implementation

Verification (testing)

Week 11 (*commencing 4th May*)
Demonstration

Week 12 (*commencing 11th May*)
Portfolio submission

After week 12
Maintenance

5.3. Risk assessment

5.3.1. Challenges

- Connecting multiple clients to a single database stored on a server
- Coding as a team (working on different parts of code which comes together to make a functional program)
- Making a user friendly interface which is easy to use by a large variety of users
- Creating an efficient database structure to allow for fast processing and accurate query results
- Sufficiently testing program to ensure no room for error

5.3.2. Skills required

- In depth knowledge of Java GUI Programming
- PHP programming for a web interface for student users
- Incorporating SQL queries in Java code
- Creating a server which will communicate with multiple clients
- New skills will be acquired through the web and books
- PHP knowledge can be acquired in parallel from COMP284 - *Scripting Languages*

5.4. Contingency plan

Event	Probability	Impact	Prevention / Responses
One member of team with specialised expertise becomes unable to contribute (eg. sickness)	Low	High	Redesign project requirements if necessary to accommodate skillset of the team Acquire the necessary skills
A task upon which other tasks are dependent has been delayed or not been completed	High	Low	Emphasise the importance of the project schedule Assign additional team members to help complete that task Reassign task to another team member if severe
Miscommunication leading to unexpected task outcomes (especially over the Easter holiday)	Medium	Medium	Clear communication of task deliverables Regular communication to avoid divergence Emphasise guidelines outlined in requirements and design documents
A member of the team is unable to attend a meeting	Medium	Low	Produce minutes to keep team updated on meeting events The absent member has the responsibility to catch up and find tasks to complete

6. Bibliography

Connolly T.M. and Begg C.E. (2004). *Database Solutions: A step-by-step guide to building database*, 2nd edn. Pearson, Addison Wesley

Elmasri R. and Navathe S.B. (2011). *Database Systems: Models, languages, design, and application programming*, 6th edn. Pearson

Zito M. (2015). *General Purpose Course Notes*

Zito M. (2015). *Group Software Project Lecture Material*