EGERTON UNIVERSITY

PROJECT SOFTWARE DESIGN DOCUMENT

FOR

TITLE: GAMES MANAGAMENT SYSTEM

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DATES: 01-08-2018
VERSION: 002

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1. INTRODUCTION

1.1Purpose and Scope

The purpose of this software design document is to act as a blueprint for the implementation of games management system by provide a low-level description of the system thus providing insight into the structure and design of each component. An overview of the system modules is given, including descriptions, use-cases, database models, activity diagrams. In short, this document is meant to equip the reader with a solid understanding of the inner workings of the system. It is intended to provide a guide to the system developer and act as a reference during the development process and to assist in further development and improvement of games management system. The document is provided to the project supervisor as a means of assessment and an elaboration of how the solution stated in the system proposal is achieved.

1.2 Project Executive Summary

The proposed system is a web-based management system for the university games department to manage all its sporting and gaming activities. Therefore, if a user has access to Internet connection and any computer with a browser he or she is set to use the system.

Since most of the work in the Games Department is done manually, this system is intended to significantly improve the operations such as communication between the Games Department coordinator, the games tutors (patrons), the games in-charges (coaches) and students who participate in the various sporting events. Currently, manual reports have to be written to keep records, communicate to finance and facilitate communication between various parties. Advertisements of sporting events are done through printed notices and through communication on social media. The coordinator is the head of Games Department, under him exists three tutors who work closely with the coordinator. Tutors can take the responsibilities of in-charges or coaches in situation where there are no instructors for a particular activity. In-charges (coaches) manages a particular gaming activity as stipulated by the coordinator.

The system development will therefore depend on these individuals to acquire the requirements necessary to develop the system.

The coordinator registers all the games and sporting events that occur in the university. He or she also assigns the patron to a particular gaming activity. The coordinator can also develop the budget for a particular event through finance approval.

The patron approves request from students and adds students who participate in that particular event that he or she is in charge. They can also communicate with the system coordinator to requests for funds for various activities, inform him of upcoming events and also communicate with the students participating in his sporting event.

Independently, there exists a store clerk who is the secretary to the games store. He manages day to day activities and records the inputs and outputs of the games store.

The student should be able to communicate to the patron, view upcoming events and also check whether their remunerations have been disbursed.

1.2.1System overview

Since most of the work in the Games Department is done manually, this system is intended to significantly improve the operations such as communication between the Games Department coordinator, the games tutors (patrons), the games in-charges (coaches) and students who participate in the various sporting events. Currently, manual reports have to be written to keep records, communicate to finance and facilitate communication between various parties. Advertisements of sporting events are done through printed notices and through communication on social media. The coordinator is the head of Games Department, under him exists three tutors who work closely with the coordinator. Tutors can take the responsibilities of in-charges or coaches in situation where there are no instructors for a particular activity. In-charges (coaches) manages a particular gaming activity as stipulated by the coordinator.

1.2.2 Constraints

The greatest constraint for the games management system project is time. There is roughly one month allocated to the development, testing, and documentation of this project, including both the front-end and the server-side application and database. Collectively, the development team has very little experience with the games management, so a significant portion of this time will be dedicated to learning the environment. Consequently, time is an even greater constraint. This may result in fewer features in the initial release, however the core functionality of the system will be unaffected.

1.2.3 Future Contingencies.

The main future contingency that may arise is the interface agreements. Although this may not be a big issue, if it arises, then the we will have to gather information on the preferred interface by the users and make necessary changes to the system

1.3 Document Organization

While the software requirement specification (SRS) document is written for a more general audience, this document is intended for individuals directly involved in the development of games management system. This includes software developers, project consultants, and team managers. This document need not be read sequentially; users are encouraged to jump to any section they find relevant. Below is a brief overview of each part of the document.

Part 1 (Introduction)

This section offers a summary of the games management system, including goals and objectives, project scope, general system details, and some major constraints associated with the intended platform.

Part 2 (Architectural and Component-Level Design)

This section describes the games management system class by class, including interface details, class hierarchies, performance/design constraints, process details, and algorithmic models.

Part 3 (Data Design)

Readers interested in how games management system organizes and handles data should consult this section, which covers data structures and flow patterns utilized by the system.

Part 4 (User Interface Design)

This section covers all of the details related to the structure of the graphical user interface (GUI), including some preliminary mockups of the games management system. Readers can view this section for a tentative glimpse of what the final product will look like.

Part 5 (Restrictions, Limitations, and Constraints)

This section discusses the general constraints imposed upon the project

Part 6 (Testing Issues)

Readers interested in the software testing process should consult this section, which offers a list of test cases, expected responses, and other pertinent information.

Part 7 (Appendices)

1.4 Glossary

SDD	System design document
SRS	Software Requirements Specification
Architectural Design	Establishing the overall structure of software system
Database	A collection of stored related data
Architectural Design	To represent (an abstract concept) by a concrete or tangible
Sequence Diagram	An interaction diagram that shows how process interact with one another and in what order

1.4 Points of Contact

The points of contact in this project includes the Coordinator, who will be able to Registers every sport in the university, assigns every game with a patron, approves funds requested for by patrons, communicates directly with patrons, approves every sport events and activities and generate reports. Games patrons should be able to Requests for funds, approves new students who wishes to join the sport, informs the coordinator about upcoming sporting events and activities, communicate directly with both the coordinator and students in his or her sport.

1.5 PROJECT REFERENCES

This document references the games management system **proposal** document and the games management system **requirement** specification document.

2.0 SYSTEM ARCHITECTURE

Games management system is a client server application that is composed of different modules that will be accessed in the web server. This application is highly portable and can run of different operating systems.

2.1 SYSTEM HARDWARE ARCHITECTURE

The system is based on three tier architecture with the following components; the database, web server and the browser that lies on the client side. The browser on the client side lies on different computers or internet –enabled electronic gadgets.

The following hardware components are used in the system:

Servers where web and application servers are hosted.

Computers / internet-enabled electronic gadgets to access the system from the web server.

2.2 SYSTEM SOFTWARE ARCHITECTURE

The following software components will be used:

Eclipse IDE - This is the environment on which the system will be built.

Web browser- e.g. Mozilla Firefox. It will be used by the managers and the management to access the system from the server.

XAMPP server on which the database server and the application will be hosted.

MSQL DBMS for data storage and access.

2.3 INTERNAL COMMUNICATION ARCHITECTURE

The communication process on the application will be like this:

There must be internet connection to enable users to retrieve data from the database and also to enable the various modules in the system to communicate with one another.

3.0 FILE AND DATABASE DESIGN

3.1 INTRODUCTION

The design of the games management system has made a centralized database to ease the access of information by the various system users. Future references of the data in the system will raise a necessity to keep the data in a persistent format. This will make sure that information will be available even if the user action has been completed. The data will also persist even when the system is changed or it is updated.

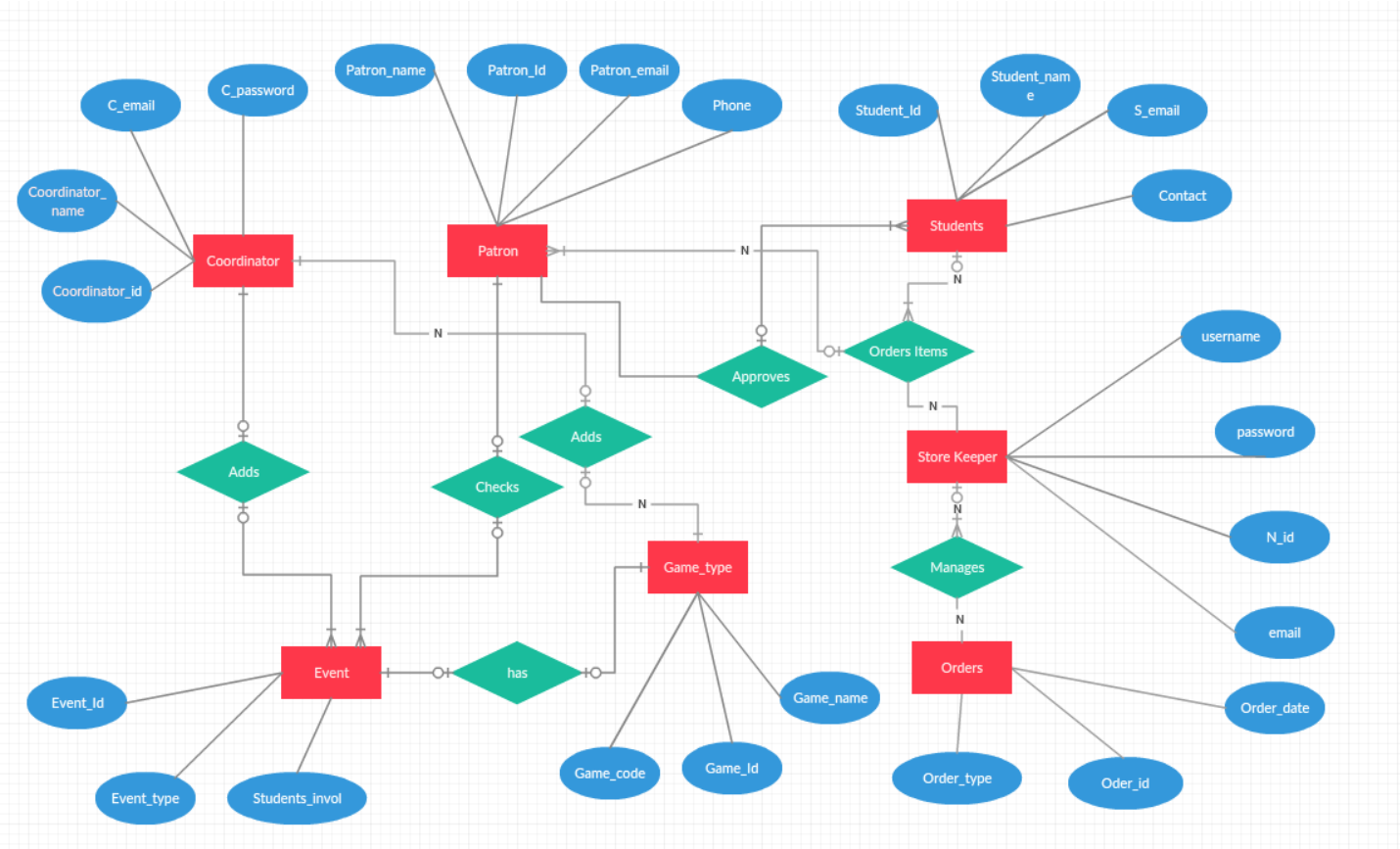


Figure 2: Entity relationship diagram for the database schema

3.2. NON-DATABASE MANAGEMENT FILES

All data will be stored in relational database to facilitate the process of central access of data by all the system users. The management of data shall be done strictly using a database.

Despite all this, reports generated from the database will be stored in the computer hard drive as excel worksheets. They shall be obtained from the computer hard drive.

3.4. DATABASE MANAGEMENT FILES

MySQL is used as the primary storage for all the data that is in the application. The reason why the database is used because it has the following qualities:

- It supports Structured Query Language(SQL)
- It is open and free.
- It supports referential integrity and transaction processing

The database also comes with associated rich set of DBMS applications that facilitate query processing, analysis of data and making reports.

To facilitate the integrity, confidentiality and security of the stored data, the database will only be accessible by the system administrator. There will be user interfacing activities on the various modules of the system to further facilitate data access and report generation.

The following entities will form the database schema.

Students relation

This is the relation that keeps the details of the Students

Options

	id	name	regno	username	password	phone	email	date_joine
Edit Copy Delete	1	James	S13/21478/15	James	james@gmail.com	0714512441	james@gmail.com	2018-07-03
Edit Copy Delete	2	Serena	K11/41417/15	Serena	serena	0741000000	serena@gmail.com	2016-07-10
Edit Copy Delete	9		S13/21416/14	DerickOduor	0f906d46d199ad9ca846650763f71e95b2f9208b	0715812661	oduorderick@gmail.com	2018-07-16
Edit Copy Delete	10		S13/21417/14	JerryObonyo	7845277e39cb6a849fcf376218a323a8d35354fb	0704514301	jerry@gmail.com	2018-07-29
Edit Copy Delete	11		N14/21454/14	PeterJama	7ae0d78c254a0d4f9841062831485891c406c3ce	0713952896	peter@gmail.com	2018-07-29
Edit Copy Delete	12		K11/41452/15	JamesOchieng	cca6be3c60b5d8ee6ed7b7ec273b21107702a15b	0712000222	james@gmail.com	2018-07-29
Edit Copy Delete	13		H12/14156/15	ElvisOtieno	58ae784fac5f883c9c1f001afb607be88d1b0086	0791874667	elvis@gmail.com	2018-07-29
Edit Copy Delete	14		A18/21045/15	PatriciaKioko	655dc0775adbc3250ed117c88763fd22392b345e	0700701411	kioko@gmail.com	2018-07-29
Edit Copy Delete	15		ED12/20121/14	Joan	34effbc77c6513be6947308b05cb3f060d0c7cbf	0787963784	joan@gmail.com	2018-07-29
Edit Copy Delete	16		S13/21456/18	CalsineAnyango	73b80b0f150eb587f506a2bafe6a3d7b6cdfde12	0715812662	calsineanyango@gmail.com	2018-07-29
Edit Copy Delete	17		S13/21415/15	Reagan	a8c276a1a04edddd0c2f897f1fe1e424cef45d75	0789110256	reagan@gmail.com	2018-08-02
Edit Copy Delete	18		S13/21416/14	JacksonKingora	0f906d46d199ad9ca846650763f71e95b2f9208b	0715812661	oduorderick@gmail.com	2018-07-16

Check all *With selected:* Edit Copy Delete Export

Figure 4: Student relation

Games Patron Relation

+ Options

	id	name	username	password	phone	email	game	game_id	date_regi
Edit Copy Delete	1		DavidOpiko	b8ddf1df02874850f9dc985c61cab0aa146dfbaa	715777774	oduorderick@gmail.com	Tennis	1	2018-06-2
Edit Copy Delete	2		JerryObonyo	7845277e39cb6a849fcf376218a323a8d35354fb	704514301	jerry@gmail.com	Karate	4	2018-07-1
Edit Copy Delete	3		PeterJama	7ae0d78c254a0d4f9841062831485891c406c3ce	713986952	peter@gmail.com	VolleyBall	3	2018-07-1
Edit Copy Delete	4		BrianOrina	d057f6d7a71f6d0c52210cc2ddddde71355a54d9d	700070016	brianorina@gmail.com	Football	2	2018-07-1
Edit Copy Delete	5		Jayden	13b6b485d60c3dd144d276bc3792a0b2c56dd7ab	714510001	jayden@gmail.com	Basketball	5	2018-07-1
Edit Copy Delete	7		Reagan	a8c276a1a04edddd0c2f897f1fe1e424cef45d75	715777774	reagan@gmail.com		0	2018-08-0
Edit Copy Delete	8		Jesse	fce8f2937a844570bcd07d28b542299e178abbd3	715777774	jesse@gmail.com	Rugby	6	2018-08-0

Check all *With selected:* Edit Copy Delete Export

Figure 5: Patron

Games Coordinator Relation

Options

	id	username	password	staffid	profile_pic	date_joined
Edit Copy Delete	1	david	7cffa68ed61a4ba9eddd3a5ea220b5be6ddf8241	12	39a899ecadabd392e49caa6191bc2a09.jpg	0000-00-00 00:00:00

Check all *With selected:* Edit Copy Delete Export

Figure 6: Coordinator relation

Events Relation

Options

	id	event_id	name	proposer	proposer_id	start_date	end_date	budget	place	event_poster
Edit Copy Delete	1	2	Nakuru Opens	BrianOrina	4	2018-07-25 09:12:12	2018-07-29 08:26:12	0	Kabarak	2b9f0c7e521ee4ddef81d0
Edit Copy Delete	2	6	Interyears Soccer	derick		0000-00-00 00:00:00	2018-08-10 00:00:00	0	Egerton University	3173788189d9f49b27397f
Edit Copy Delete	3					0000-00-00 00:00:00	0000-00-00 00:00:00	0		
Edit Copy Delete	4	5	Karate	jackson		2018-08-15 00:00:00	2018-08-17 00:00:00	0	Egerton University	f3eb807ca607faca96dfd63
Edit Copy Delete	5					0000-00-00 00:00:00	0000-00-00 00:00:00	0		
Edit Copy Delete	6	8	Karate	derick		2018-08-16 00:00:00	2018-08-17 00:00:00	0	Egerton University	42b49e654a0e27844d7d9
Edit Copy Delete	7					0000-00-00 00:00:00	0000-00-00 00:00:00	0		
Edit Copy Delete	8	11	NakuruOpens	derick		2018-11-02 00:00:00	2018-11-04 00:00:00	0	MKU	9157a9f272fdc73bb12e19
Edit Copy Delete	9					0000-00-00 00:00:00	0000-00-00 00:00:00	0		
Edit Copy Delete	11	49	AbcDef	derick	1	2018-09-07 00:00:00	2018-09-09 00:00:00	0	Egerton University	
Edit Copy Delete	12	51	TestEvent	derick	1	2018-09-21 00:00:00	2018-09-23 00:00:00	0	Egerton University	

Check all *With selected:* Edit Copy Delete Export

Figure 7: Events relation

Games relation

+ Options

	id	name	patron	patron_id	day_established
Edit Copy Delete	1	Tennis	davidOpiko	1	2018-06-21
Edit Copy Delete	2	Football	BrianOrina	4	2018-07-16
Edit Copy Delete	3	VolleyBall	PeterJama	3	2018-07-16
Edit Copy Delete	4	Karate	JerryObonyo	2	2018-07-16
Edit Copy Delete	5	Basketball	Jayden	5	2018-07-16
Edit Copy Delete	6	Rugby	Jesse	8	2018-08-09

Check all *With selected:* Edit Copy Delete Export

Figure 8: Shows the games relation

4.0 HUMAN-MACHINE INTERFACE

4.1 INTRODUCTION

The system will consist of a registration module where all the users of the system will be registered. The users will be divided into four domains. These are the Students, Coordinator, Tutors and Coaches. The users will open a web browser and access the registration module where they will be registered by keying-in their personal details. The user details will be recorded and stored in the respective relations in the database. After that, the users will then log in to the system and access it using the details already stored in the database.

Users will input their login credentials and they shall be authenticated. After authentication, the users shall be able to perform their respective functions as stipulated in the Software Requirements Specification. Each user, upon successful login will be directed to their respective modules that will enable them to perform their respective functions.

Registration Module

After the user has accessed the system by use of a web browser, there will be a registration module that will be as shown below. This will prompt the user to enter their details. After that, the user will be prompted to login using the details that they registered with. The login details will just be the username and the user password.

Student Registration

Tutors Registration

COACHES REGISTRATION

Login module

Tutors Dashboard

Cordinator Dashboard

Coaches dashboard

Admin dashboard

4.2 INPUTS

All data inputs will be in text formats. The input fields include text areas, text fields, drop down as described in the registration module above. For each text input, the acceptable input will include the alphanumeric characters. The range of the inputs will be set as required. Failure to conform to the range of the inputs will generate an error.

There will be a client side and server side validation of each input data to ensure that there are no null entries and that also the input types are valid. Security will also be checked on the client side by encrypting the data and also by eliminating SQL injections.

4.3 OUTPUTS

The system will output a range of data based on the user needs. Reports in the system will be generated and data will be outputted as either read-only based on the user roles and needs.

5.0 DETAILED DESIGN

5.1 HARDWARE DETAILED DESIGN

The system will run on a number of hardware components.

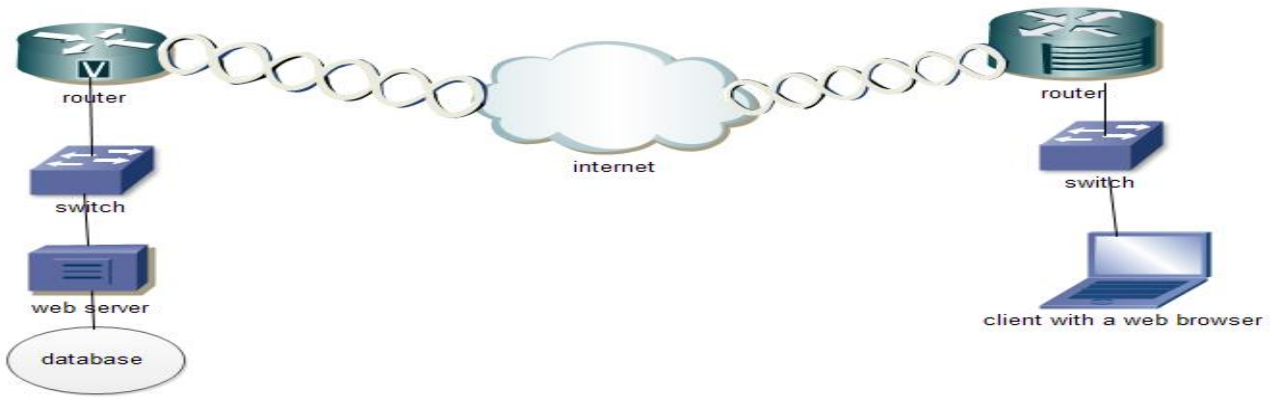
- Router
- Network switch
- Web server

- Client PC. With at least 250 MB RAM and 1.5 GHZ processor speed.

- Client machine should have a browser. E.g. Mozilla Firefox

The physical component connection is depicted in the diagram shown below.

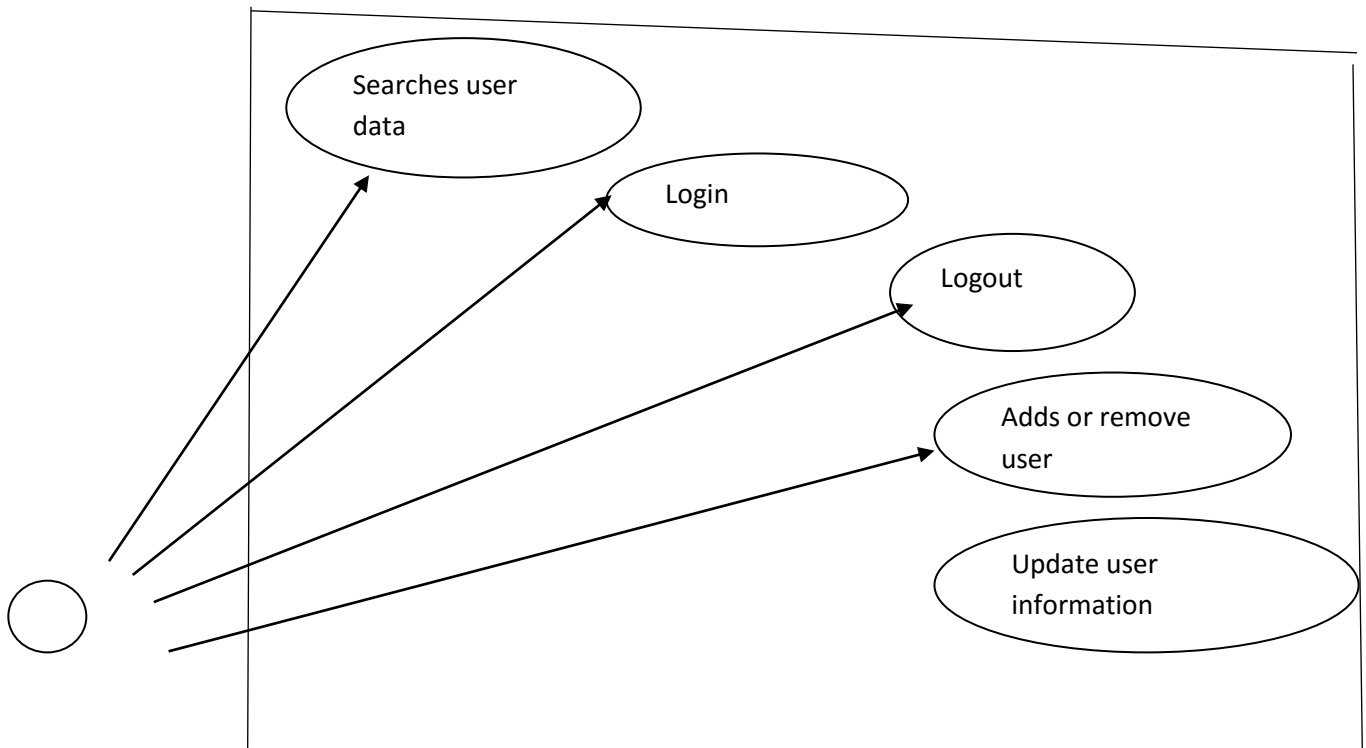
Diagram

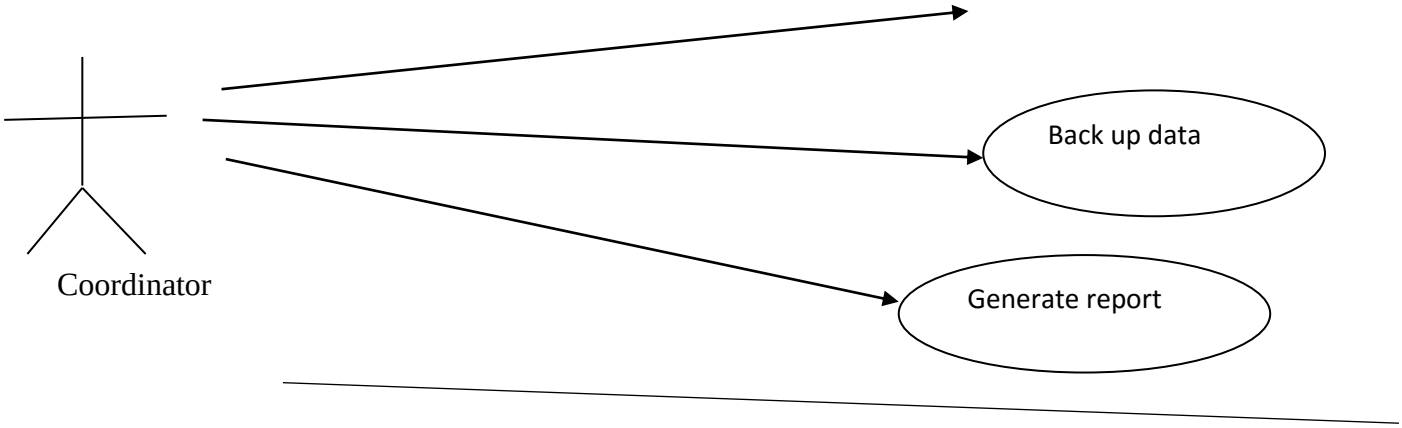


5.2 SOFTWARE DETAILED DESIGN

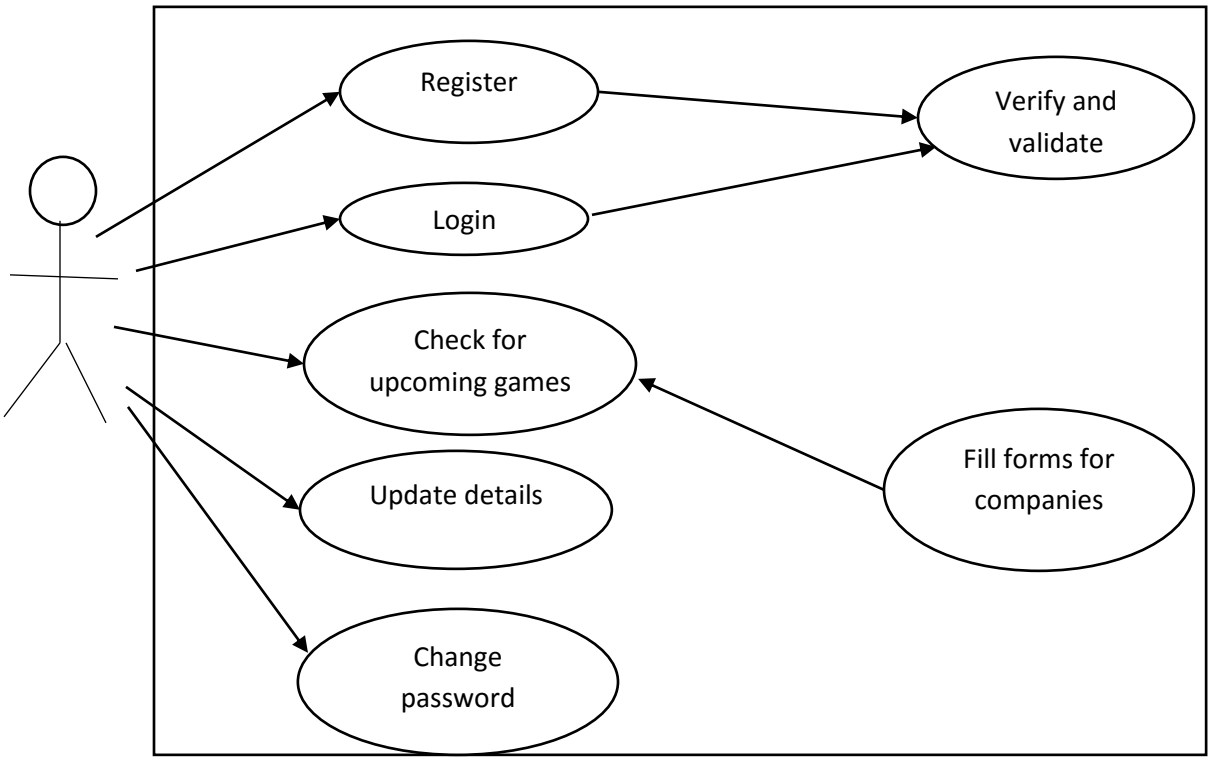
The system consists of the following modules. Each module is shown by a use case described below having the specific functionalities. The criterion of grouping these modules is based on the user roles. There are four actors in the system. There are the students, Coordinator, coaches and the student.

Coordinator

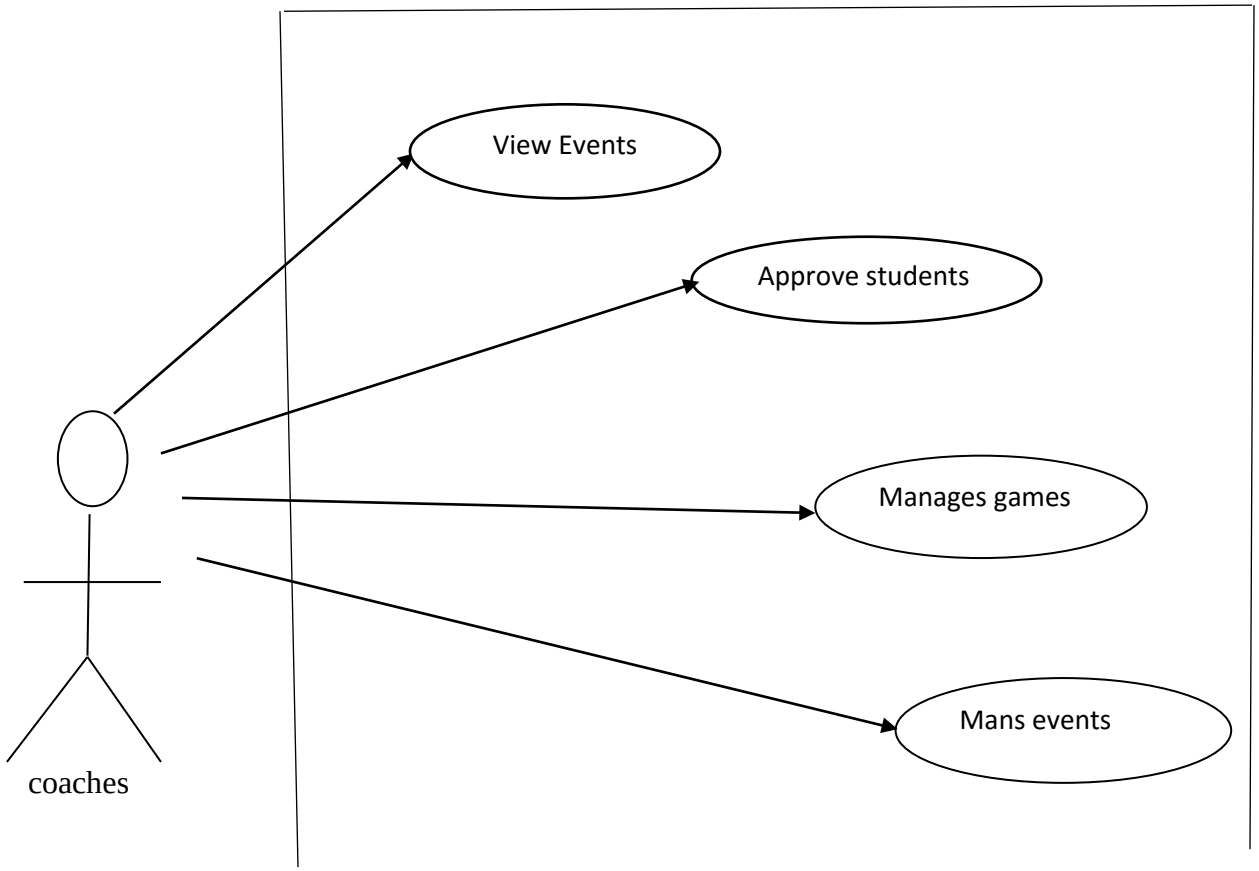



Coordinator
Back up data
Generate report

STUDENT


Register
Verify and validate
Login
Check for upcoming games
Fill forms for companies
Update details
Change password

Patron


View Events
Approve students
Manages games
Mans events
coaches

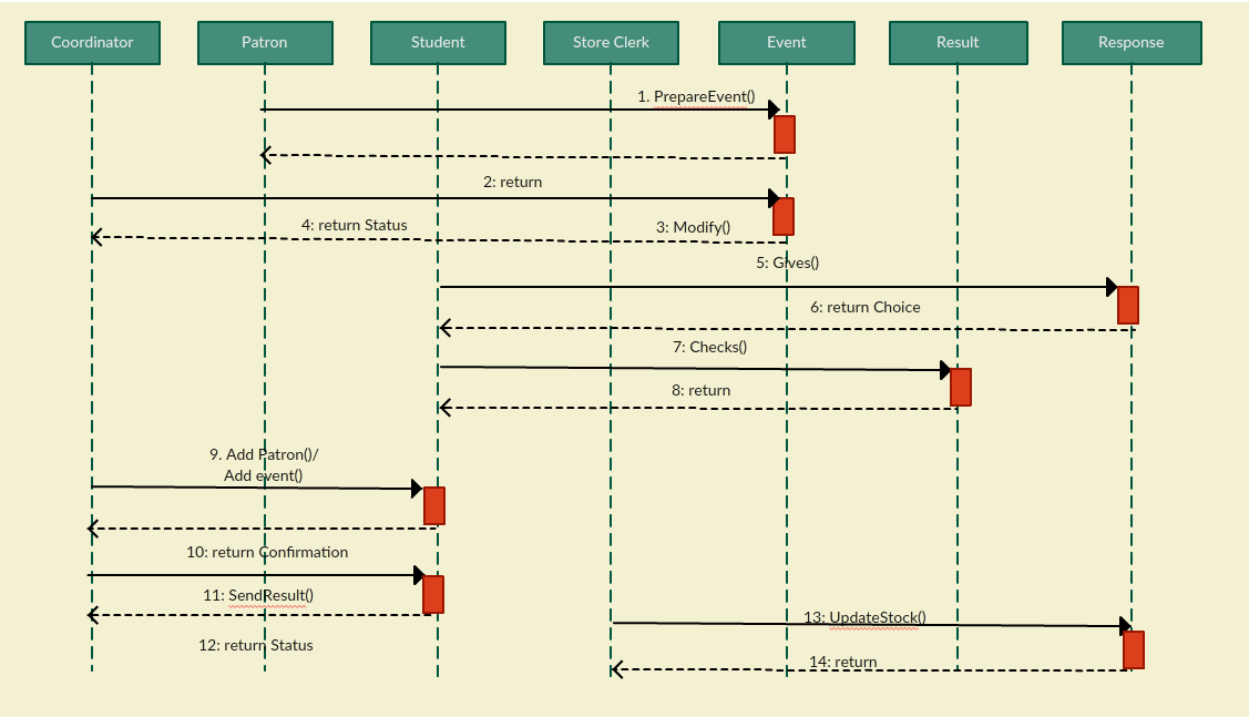


Figure 4: Sequence diagram

The database: it is used to store data

5.3 INTERNAL COMMUNICATION DETAILED DESIGN

The business flow of information from one module to another in the system will make internal flow of information necessary. The internal flow of information will be in form of object communication among various objects of the classes in the system.

The internal data communication will be handled by the HTTP protocol that will relay messages between various objects in the system.

Communication between the system and the database will be facilitated by various user interfaces describes earlier in the human- machine interface section which will ensure that data from the client is successfully stored in the database.

The interface will also ensure that data can easily be fetched from the database, updates and deletions can be done without affecting the consistency of data.

External data communication between the system and the external environment will be realized by use of the internet connection between the system and the external environment through which data will be sent.

6.0 EXTERNAL INTERFACES

6.1 INTERFACE ARCHITECTURE

External interfacing will facilitate the communication between the application and the external systems. Communication will be through TCP/IP since all the communications will be done through the internet.

Specific network architectures implemented for the client, server and the database PCs does not matter, all that is needed is an active link of communication between these components and any other external systems that the application will be exchanging information with.

6.2 INTERFACE DETAILED DESIGN

Since communication is through TCP/IP, there is no need to reformat data before it is transmitted or received over the interface between two different communicating modules.

Data exchange over the interface will be purely regulated by the protocol. Errors arising from such exchange will be handled dynamically by the protocol.

Errors arising will be handled and a brief error description given to the user in HTML format.

7 SYSTEM INTEGRITY CONTROLS

Based on the sensitivity and importance of the data that is passed between the various modules of the system, there is need to put in place integrity checks to ensure correctness of the stored data and accountability on the part of every system user. The following security control measures will be implemented to enforce integrity controls

1. Authorization control. This ensures that users can only access data that belongs to their user groups based on user roles.
2. Access to the data in the database will be restricted to various user groups based on the user roles. Users can only update data that they have supplied. Update of data affecting the whole system will only be restricted to the system administrator. Data deletions will also be limited to certain classes of users based on the user roles.
3. Integrity control. This ensures that data stored in the database cannot be violated or altered by any unauthorized parties in any way whatsoever.
4. Authenticity control. This aspect of security will verify user credentials at the time of login into the system. This ensures that only authorized users are allowed to access the system.
5. Confidentiality control. This is a security technique that prohibits unauthorized access of personal information.
6. There shall be a system audit mechanism that automatically collects data based on user transactions to monitor user activities in the system. The audit will be available to the system administrator in form of log information detailing user activities, user identifications and time so as to enhance accountability.

Server side and client side validation of data to ensure no wrong inputs are accepted into the system.

Due to the various types of attacks that are in existence today, the system has taken into considerations just but a few of these attacks. For example, SQL injection and session hijacking attacks have been greatly controlled in this system.

3.3 NON-DATABASE MANAGEMENT FILES

All data will be stored in relational database to facilitate the process of central access of data by all the system users. The management of data shall be done strictly using a database.

Despite all this, reports generated from the database will be stored in the computer hard drive as excel worksheets. They shall be obtained from the computer hard drive.