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Academic Conference System by Using a Design Pattern

Aisha Omar Zobaida

(faculty of Information Technology, Bani waleed University, Bani-waleed, Libya)

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Abstract:

The most important challenges which face software engineers are those of how to make the technology management meet the needs of the uses in order to save time and effort and make life easier, to achieve these goals, the software engineers need to the best practices of experienced software developers which contains the best and repeatable solutions to frequently problems which called "a design pattern"

In this report, researcher focuses on analysis and track and manage the transactions of academic conference system, as well as, she will evaluate the effectiveness and impact of use of ‘a pattern design' on this system.

Keywords: pattern design, academic conference system, database

Introduction:

One of the main challenges of software engineers is how to make the technology management solutions meet the needs of economic and social life and developing scientific research in order to save time and effort and make life easier and more accessible. In these days, information technology and the internet have become dominant in the all fields, especially in the field of education and scientific research. one needs to demonstrate the difficulties facing the researchers and members of the faculty and to point out the benefits one gains from the new devices. In general, the academic conferences system has a lot of transactions like submission/ download/view of paper, paying fees, the registration for different type of member and confirm it, accept or reject paper, management of reference and Attended lecture..etc. In this research, the academic conference system helps the researchers (author) and PC member and PC chair do all the transaction related with the research and author and other members which make the work load and the time making the PC member job easy and simple. It also supplies information about the paper details, autor details and number of attendees. etc .it also make schedule for activities of conference will be defined correctly by various sessions without an inconsistency in Components of schedule actors (time. Authors. Hall). it makes control on access to system with deferent responsibilities and functionality and send automatic email to confirmation the different transactions. moreover, it enables the permitted user from download the paper by different format. so, this system will help improve the researches in the

academic conferences and saving time and efforts for the members and providing better services for the users.

In this research I am going to achieve all goals which mentioned above by using a Design pattern, moreover, I am going to discuss that how I choose the right type of pattern to different part of system.

1.SYSTEM ANALYSIS: -

1.1. Problem statement: - academic conference is international conference which consist from different type of participants and workshop and tutorial sessions and long processed of paper an evaluate it with complex transaction for track conference attendees and to manage the schedule of session conference and workshop which usually have inconsistency in author and hall timetable

1.2. The goals of the system: -

- Allow participants from quickly and easily register for conferences with different Privileges
- The system will track the registration information and calculate all fees for the participant based on their Privileges which they selected.
- The schedule for activities of conference will be defined correctly by various sessions without an inconsistency in Components of schedule actors (time. Authors. Hall)
- Manage the author submission and notify and change on the paper
- Send automatic email to participant who interested in specific subject when there is conference on his/her interested topic
- Send automatic email to Author when there is any change in 'call for paper'
- Make control on access to system with deferent responsibilities and functionality
- It enables the permitted user from download the paper by different format

academic conference system: - provide a lot of functions and Features which represent the interaction between the system and users (actors)

1) View paper
2) Download paper
3) Evaluate paper
4) express reservations
5) send comments to authors

1.3. Use case diagram: - is a representation of actor interaction with the system and describing the specifications of a use case [8]

The actor of system: -

1. **Participants**

a) Registration
b) Payment fees
c) Attended lecture

2. **Author**

a. Make Submission of paper
b. Modify submission
c. Register Co-authors
d. View the paper
e. View the result of evaluate paper

3. PC Chair

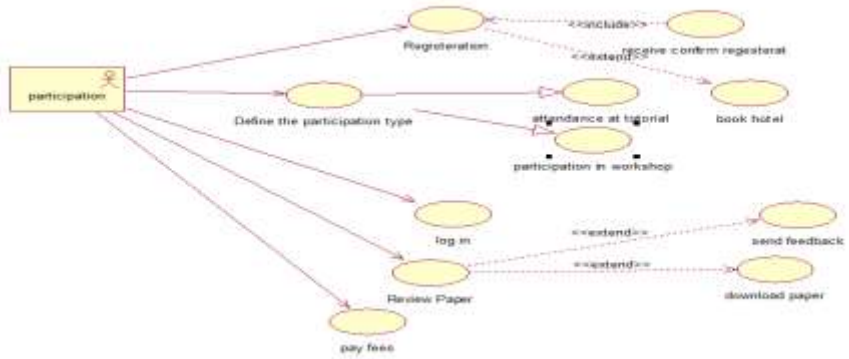
a) Create new conference
b) Modify conference information
c) Accept or reject paper
d) Assign Referees to paper
e) Schedule conference
f) Call for paper

4. PC member

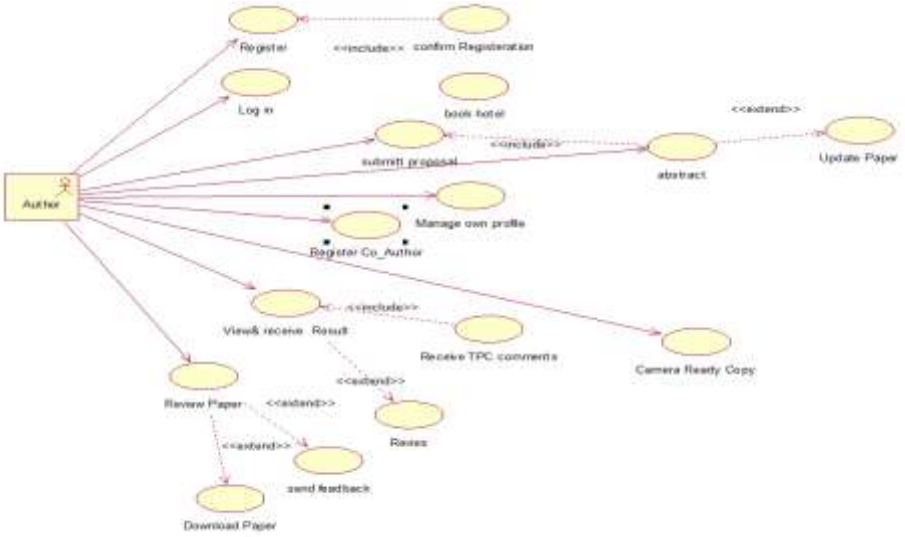
a) Confirm registration for participants
b) Assign accepted paper to topic
c) Assign details for every paper
d) Manage accommodation and social event issues

5. Referees

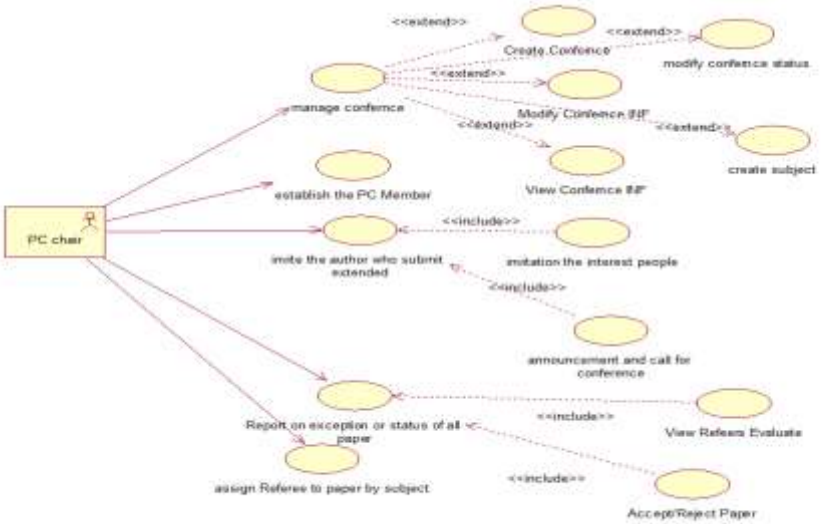
1.3.1. The use case of participant:



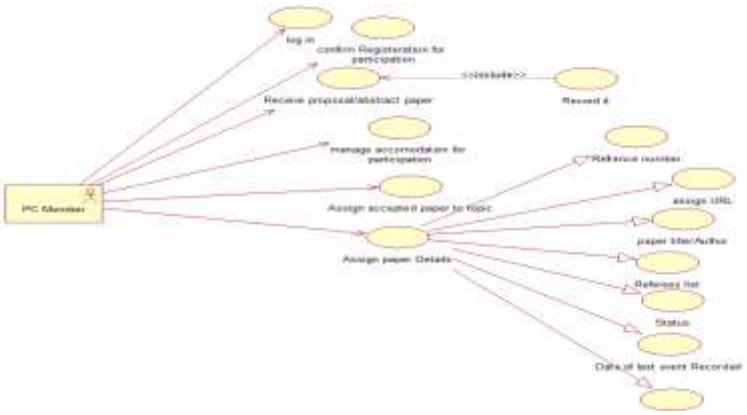
1.3. 2.The use case of Author: -



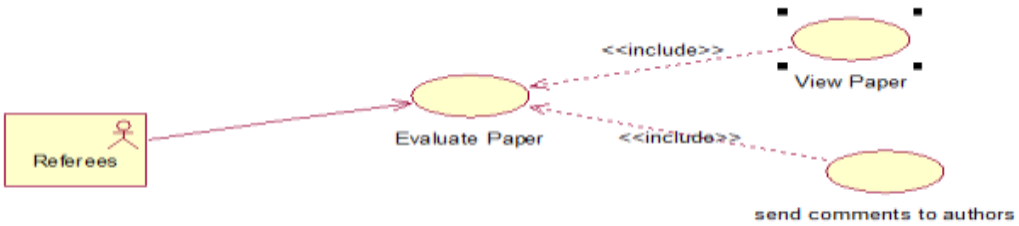
1.3.3. The use case of PC Chair: -



1.3. 4.The use case of PC Member: -

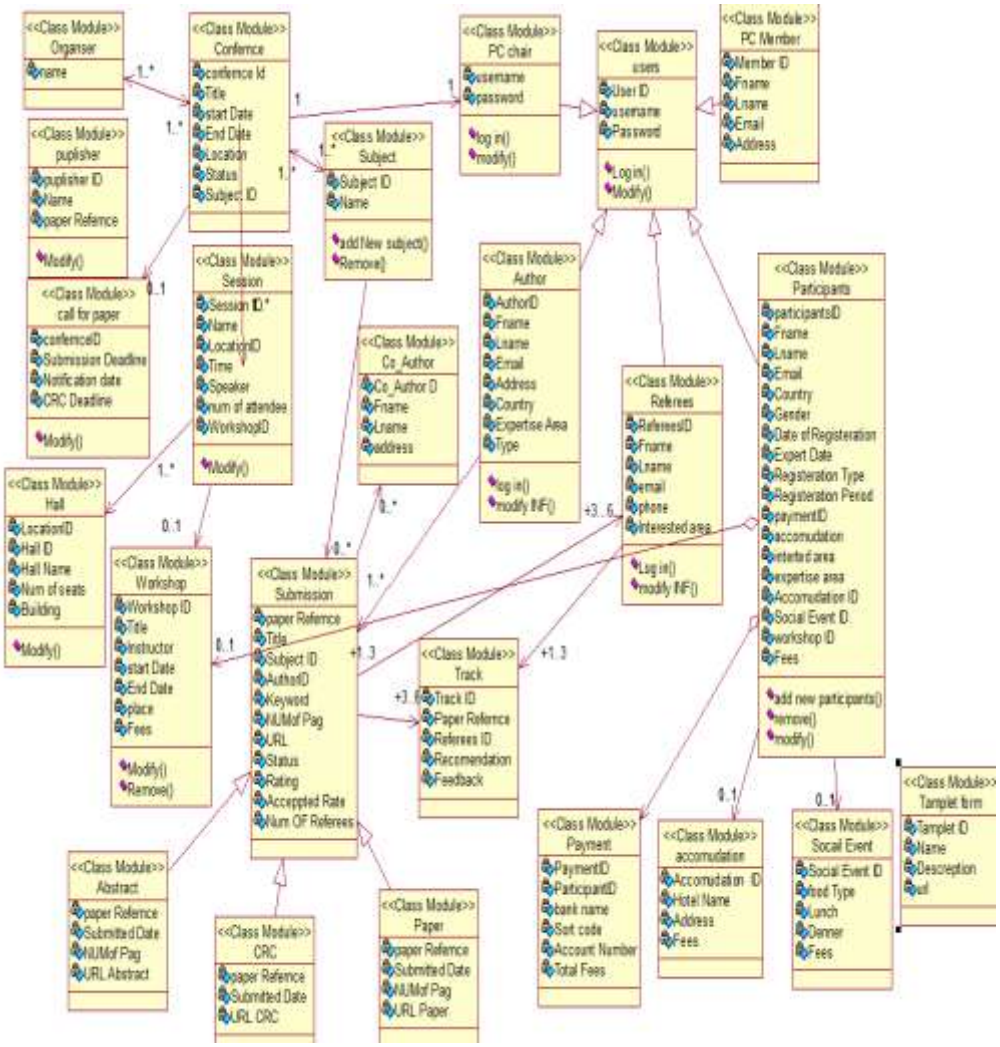


1.3.5. The use case of Referees: -



2.SYSTEM DESIGN: -

2.1. Class Diagram: -is providing an overview of the system design by describing the objects and classes inside the system and the relationships between them. [9]



2.2. Sequence Diagram & design pattern: -

WHAT IS A DESIGN PATTERN?

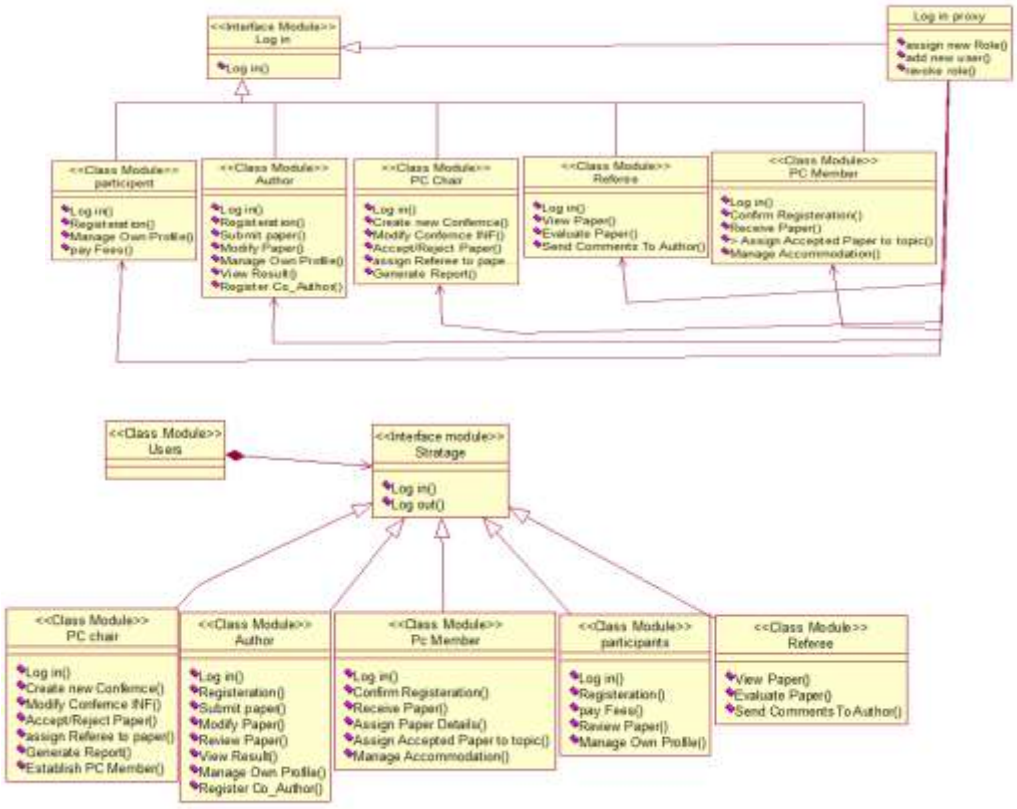
A design pattern is a documented best practice or core of a solution that has been applied successfully in multiple environments to solve a problem that recurs in a specific set of situations.[1]

- Architect Christopher Alexander describes a pattern as "Each pattern describes a problem which occurs over and over again in our environment, and then describes the core of the solution to that problem in such a way that you can use this solution a million times over, without ever doing it the same way twice"

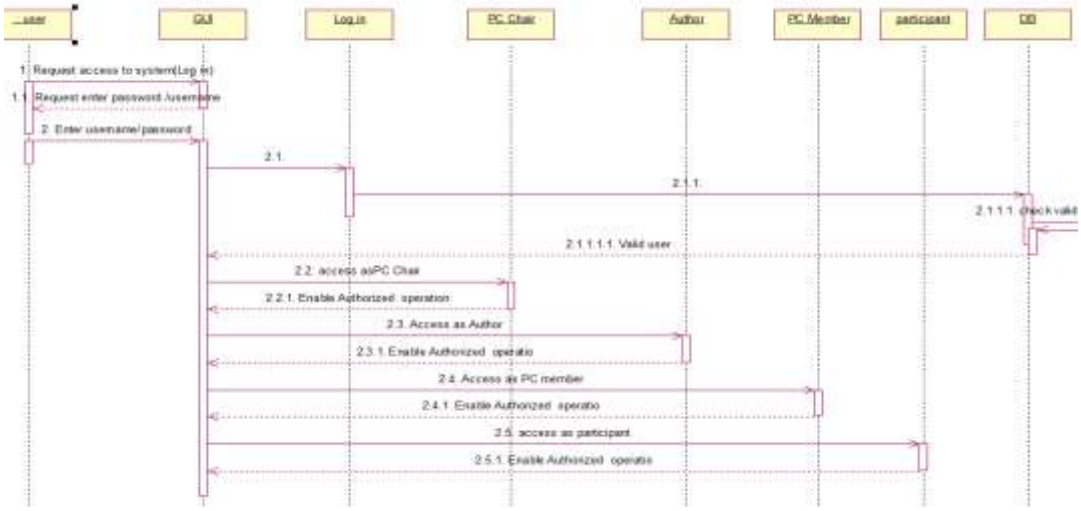
Pattern application in cadmic conference system class diagram: -

1. It make a permission authentication access to the system for their users only with different types of functionality and Responsibilities by: -

A. **strategy pattern**: -When a user requests access to conference to execution any operation or any request, in first time the user will be tested if has authorized to use the system or no then the request should be check that the request is from his / her responsibilities security or no



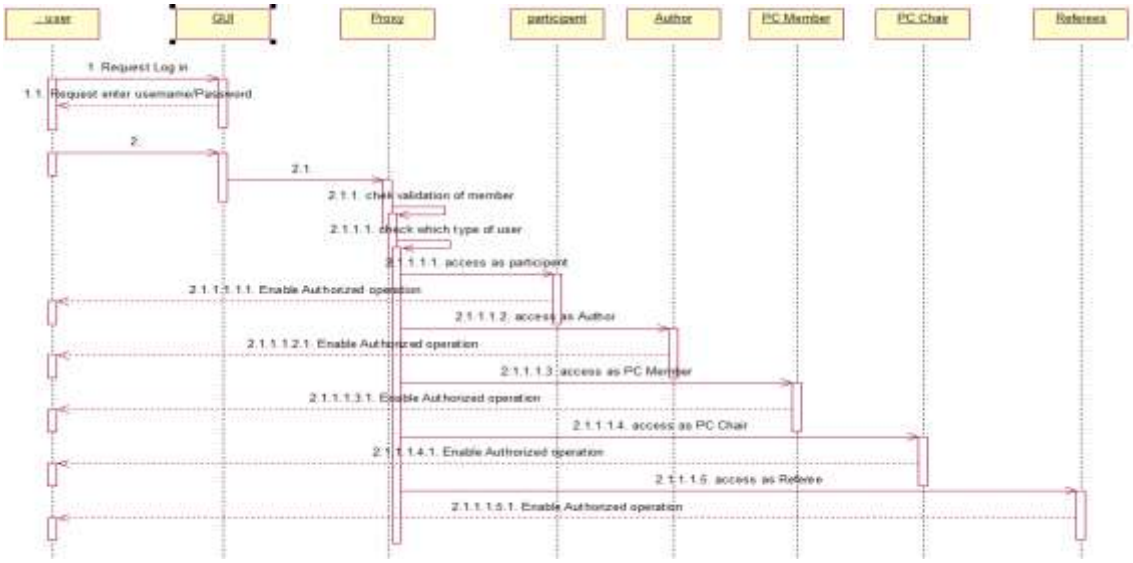
2.2.1.A. Sequence Diagram of log in: -



B. proxy pattern: - Provide a proxy or alternative for object to control access to it. In this case the proxy pattern provides access to all features of conference system are controlled by a set of permissions which are allocated on type of a user's policy at the conference

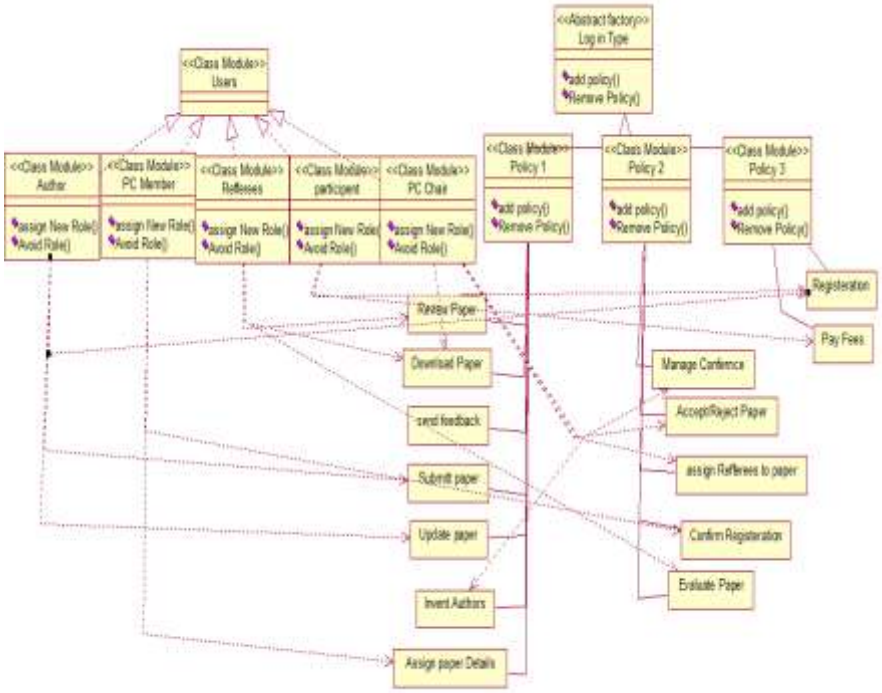
In my opinion that proxy pattern is more suitable in this case because in conference system different people have different levels of access to data. In order to determine the level of access, the Proxy pattern make permission for the individual objects that contain the actual operations requested by the Client.

2.2.1.B. Sequence Diagram of log in: -

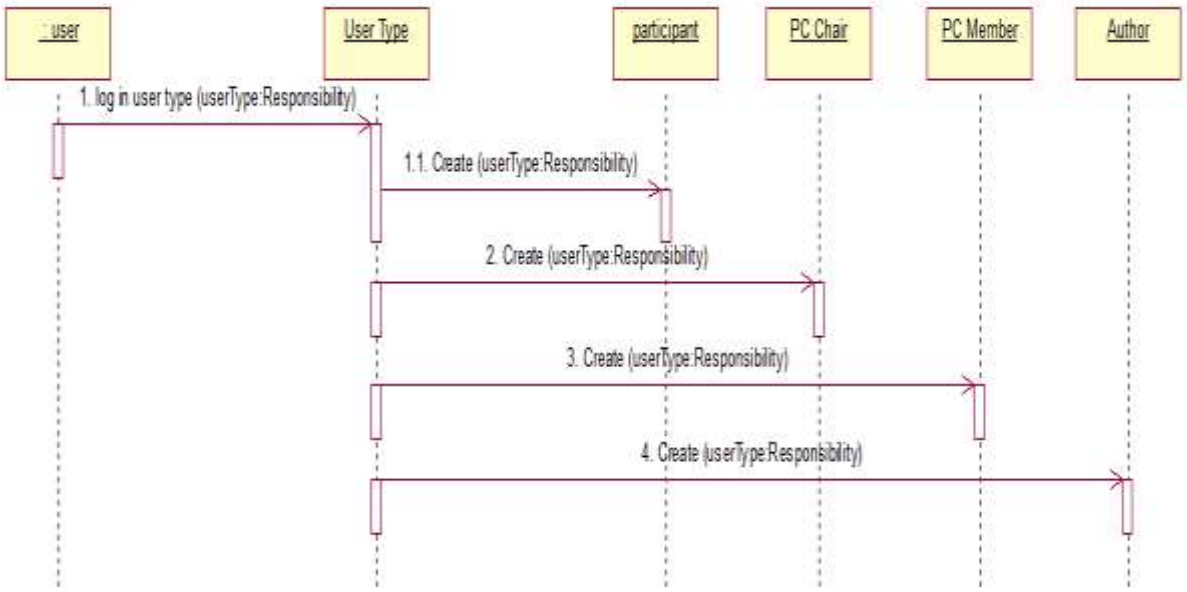


c. abstract factory: - The essence of the Abstract Factory Pattern is to "Provide an interface for creating families of related or dependent objects without specifying their concrete classes."[2] in this case the abstract factory used to create different types of Administrator objects (families of related or dependent objects) with different responsibility and functionality.

The cause of choose this pattern that, we need another layer of abstraction which will identify user type to access correctly to his/ her account without even giving a single hint to user and then the user can access to all his / her Authorized operation. This is exactly the problem, which abstract factory pattern is used to solve.



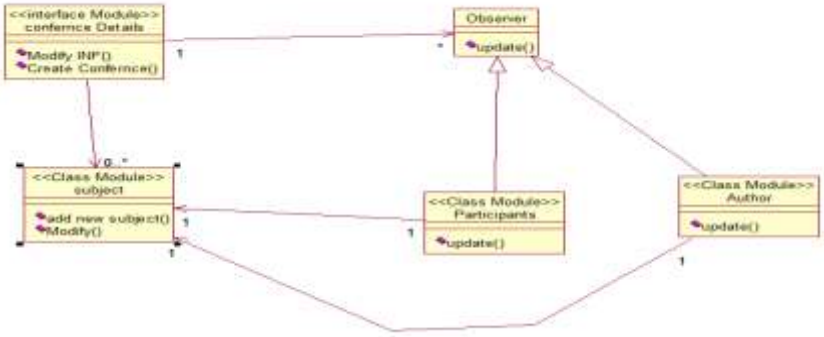
2.2.1.C. Sequence Diagram of log in: -



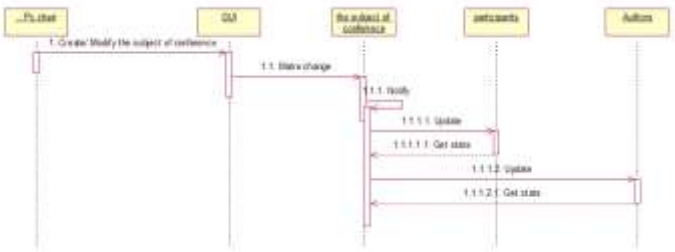
Evaluate the alternatives: **- in my opinion the proxy pattern is the best pattern in this case for reason which mentioned above**

2. The system can send notice automatically to interested users for specific subject by use: -

A. observer pattern: -in observer pattern it is well known that when any object of its dependence object makes changes on its state, all its dependents are notified and updated automatically. In this case. if there is new conference is created in specific subject or the general subject of conference is changed. The author and participants who is interested in this subject will be notified it.

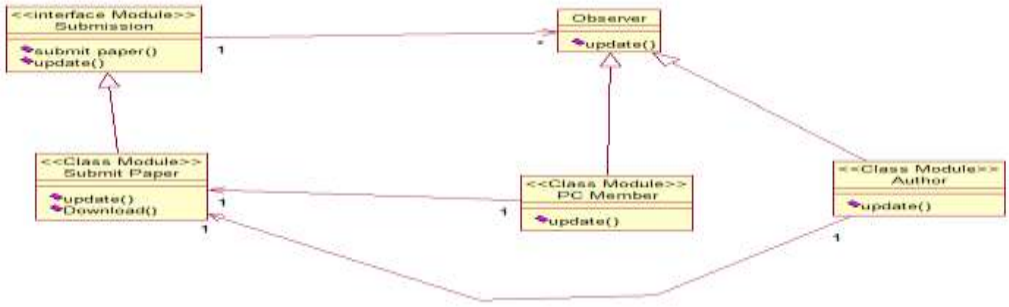


2.2.2. Sequence Diagram of send notice automatically to interested users: -

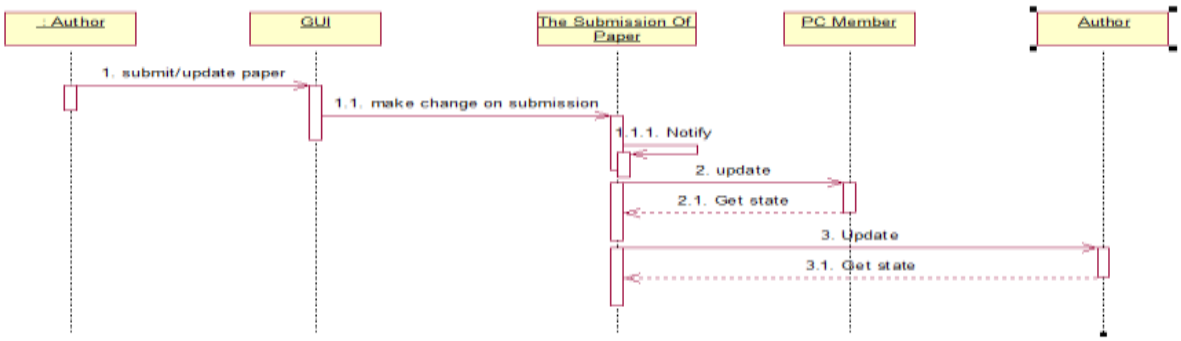


3**. There is notice will be sent to PC member, if the author submit the paper or update it by use: -**

A**. observer pattern**: -if there is a new submission or update it, the conference system will send note to the author and PC member about the new paper that has been submitted or updated. Since, the PC Member is dealing with the new submission or updating part.



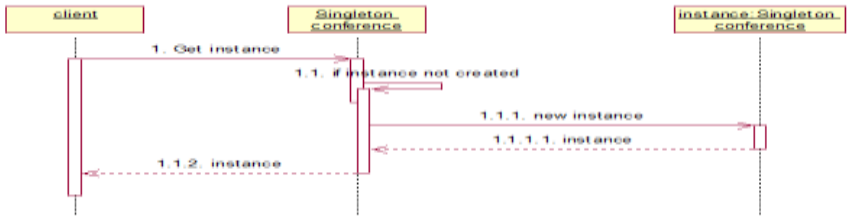
2.2.3. Sequence Diagram of notice will be sent to PC member: -



4**. To make every conference that international and it has not instance and avoid him from the repeat we can use: -**

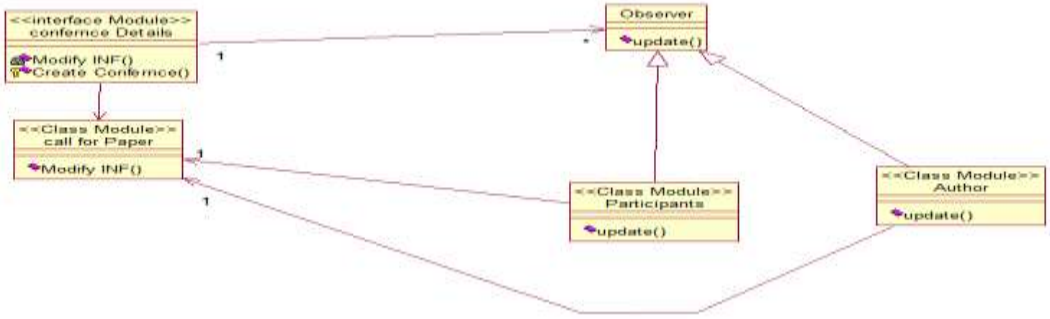
A. **singleton pattern**: - Ensures that only one instance of an object is allowed within a system and it make this object point to Global access. In this case the singleton pattern makes the conference class Unique and no any instance for it. Moreover, it provides point to Global access to conference.

2.2.4. Sequence Diagram: -

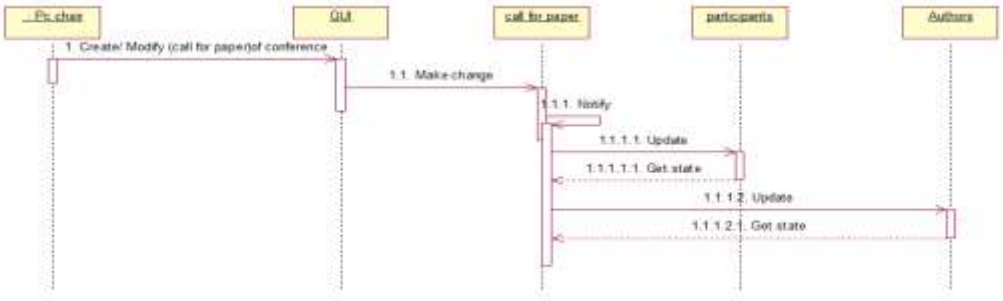


5. If there is any change happen in that the details of conference (call for paper) there is send notice automatically will be send author and other participants by use: -

A. observer pattern: - As we mentioned earlier section any object of its dependence object makes changes on its state. In this case **will** notify the author and Participants about details of "call for paper" if happen any changes of the deadline or anything else. Etc.

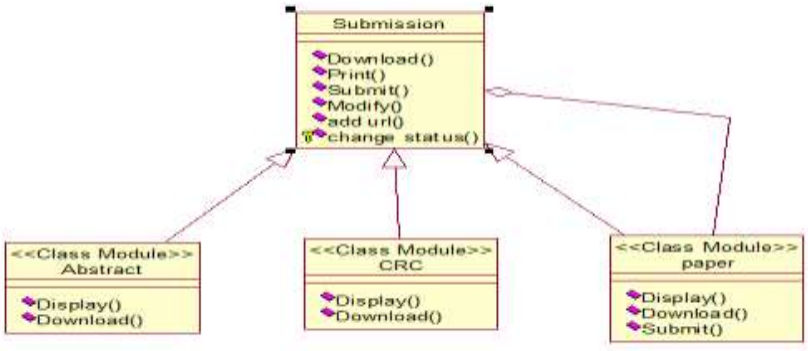


2.2.5. Sequence Diagram of send notice automatically when any change happens: -

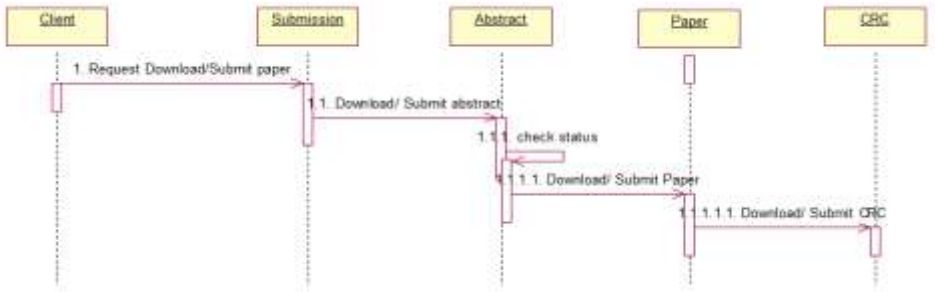


6. We can structure the submission of paper to three types by use: -

A. **composite pattern:** - we can use the Composite pattern when you want to represent part-whole hierarchies of objects. The composite pattern is suitable for this case because it makes deal and transaction with client easier depends on client choice which make the client deal with submission paper with different parts.

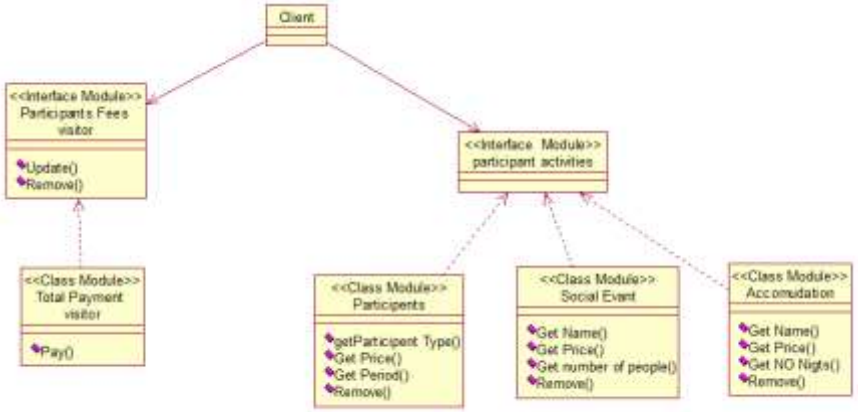


2.2.6. Sequence Diagram of structure the submission of paper: -

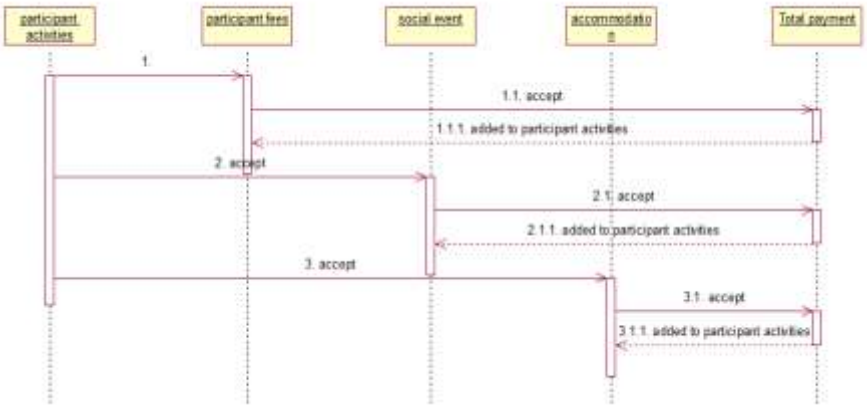


7. We can calculate the total fees for every participant depends on their requirement and his register type by use: -

A. **Visitor pattern**: - Represent and calculate operation or action to be implemented on the components of an object structure. In this case Total payment where we can calculate total fees for different type of items (participant fees), it calculates the total amount to be paid.



2.2.7. Sequence Digram of calculate the total fees: -

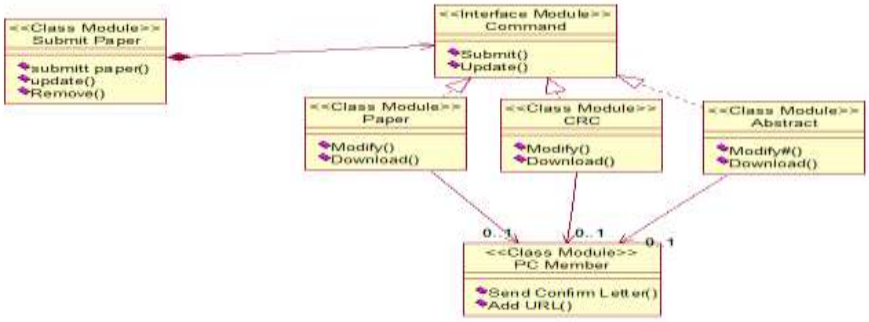


8. The system can be helping the author from complete and track the process of submit the paper and receive confirmation letter by use:

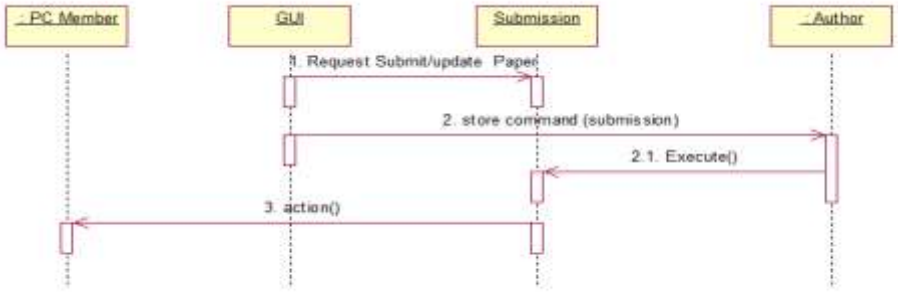
A. **command pattern**: - According to GOF "Encapsulate a request as an object, thereby letting you parameterize clients with different requests, queue or log requests, and support undoable operations"

So, we can say that the command pattern used to manage algorithms, relationships and functionality between object in term of perform request or order of a particular action in this case

The PC member receive the submission (abstract, paper, CRC) or command from an author and encapsulates that submit by add the paper Details (name, subject, url. Etc.). Note that the submit is not dependent on specific method for example the author can submit abstract first then if accepted can submit paper then CRC or submit all paper then if accepted can submit CRC, and therefore they can support commands to submit paper by many different methods



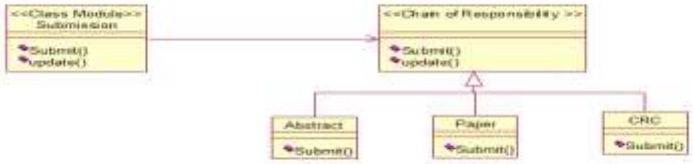
2.2.8.A. Sequence Diagram of track the process of submit the paper: -



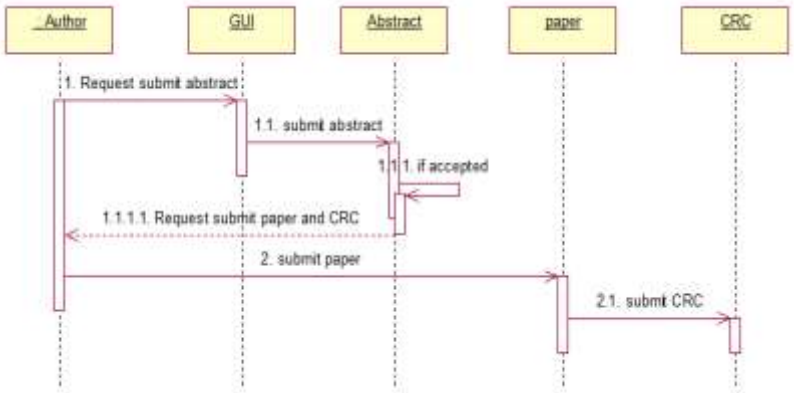
b. **Chain of responsibility pattern**. Defined by GOF is: **"Gives more than one object an opportunity to handle a request by linking receiving objects together."**

Note that the submit is not dependent on specific method for example the author can submit abstract first then if accepted can submit paper then CRC or submit all paper then if accepted can submit CRC, **in this case the author will be submit the abstract or (paper and abstract) in first time if they accepted them. then the author will be sending paper and CRC. IF abstract not accepted so the author did not need to send any more.**

The defferent between comand pattern and Chain of Responsibility: - the Chain of Responsibility pattern Passing the requests on along a chain whereas the Command pattern forwarded the order to a specific target.



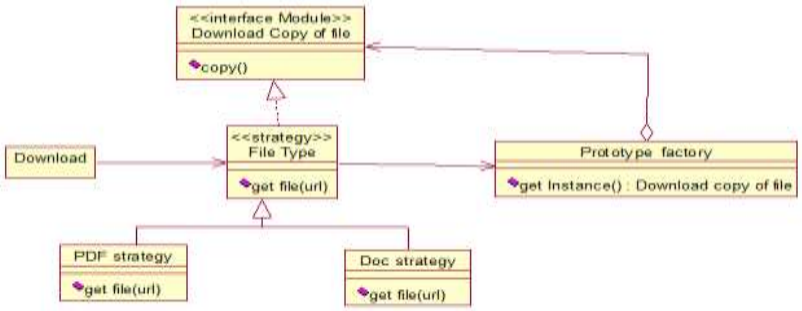
2.2.8.B. Sequence diagram of track the process of submit the paper: -



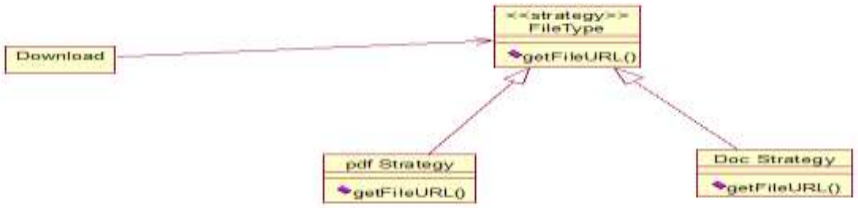
Evaluate the alternatives: - I suggested that the best solve for this problem could be by use command pattern for reason which mentioned above

9. The system can be helping the users from Download the paper by different format by use: -

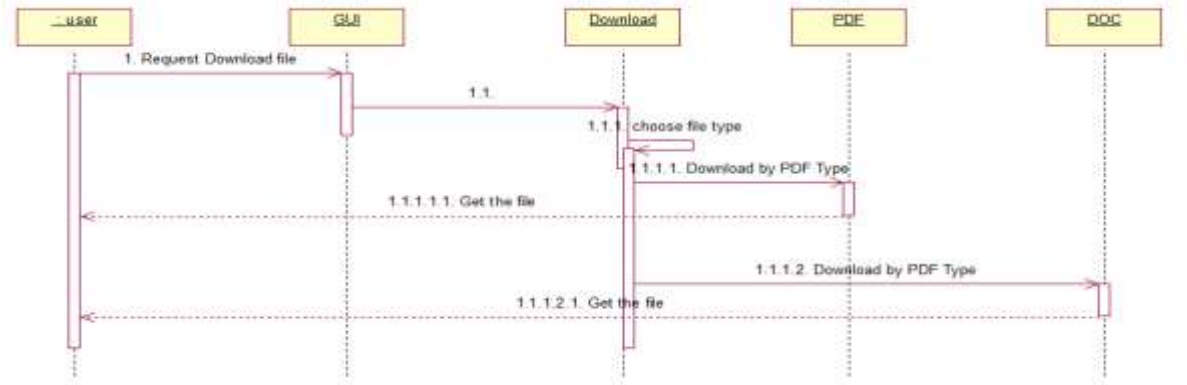
A. **prototype pattern**: - This is a creational pattern as it is used to copying, or cloning the object and control its instantiation and generation .in this case it provides cloning(copy) the object (paper) by different format.



B. **Strategy pattern: -** the GOF Definition it as "Defines a set of encapsulated algorithms that can be swapped to carry out a specific behavior "in this case the Strategy pattern used to manage algorithms, and function between objects by select suitable strategy to download file which two choices available. Download the file by PDF format or by DOC format



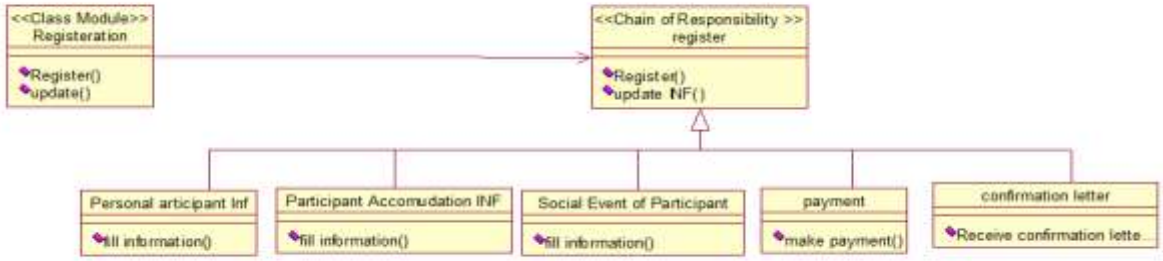
2.2.9. Sequence diagram of help the users from Download the paper: -



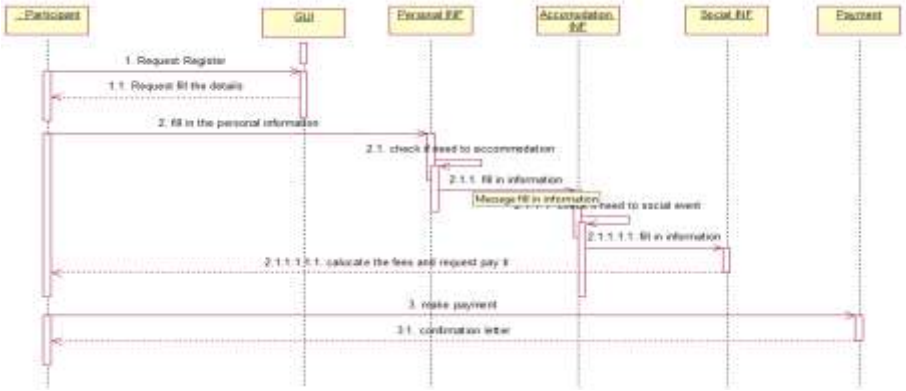
Evaluate the alternatives: - I believe that the best solve for this problem could be by use command pattern for reason which mentioned above

10. The system can be helping the participants from complete and track the process of registration and receive confirmation letter by use:

a. **Chain of responsibility pattern:-** as I monished their definition in last section this pattern is suitable for this case in Terms of that the participant who need to register Firstly should be fill in The personal Information of participant which is core and essential then the participant can move to accommodation information (which is optional)and social information (which is optional) then the participant can make payment according to their last choice which is essential and he/she cannot complete the registration without payment then the participant will be receive confirmation letter from PC member.

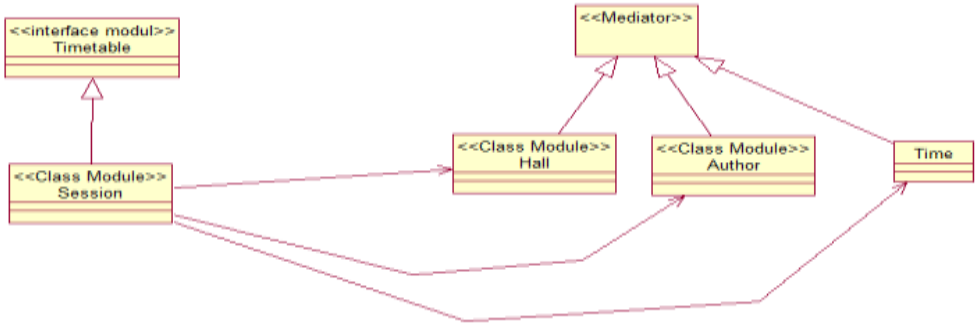


2.2.10. Sequence Digram of help the participants from complete and track the process of registration: -

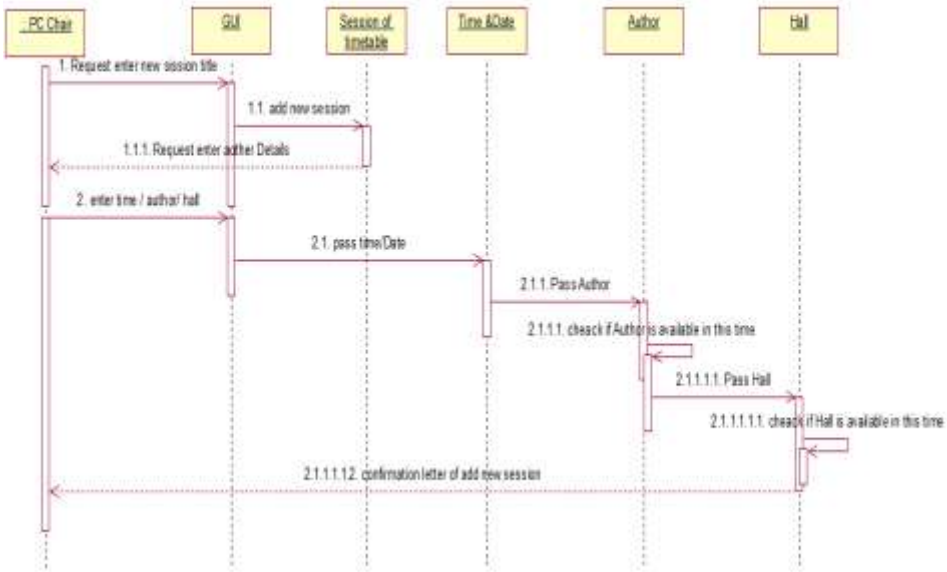


11. The more important things that the schedule of conference system should be not make conflict for Author for example the Author has two sessions in the same time

A. **Mediator pattern: - According to GoF its definition:" Allows** loose coupling by encapsulating the way disparate sets of objects interact and communicate with each other. Allows for the actions of each object set to vary independently of one another'. So, we can say that **it helps in manage the communication between author and Hall, time. For example, it avoided more than one session for author in the same time is not acceptable it can solve this problem by the mediator. If mediator is not there all the conference session have to interact with one another and managing the show will be very difficult and things may go wrong**.



2.2.11. Sequence Diagram of avoid from make conflict for the same Author: -

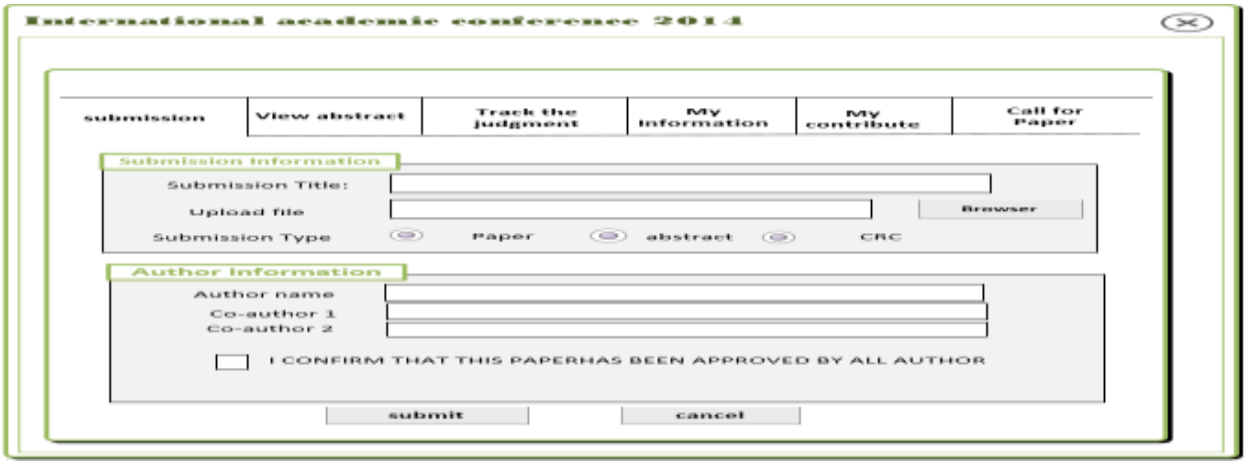


2.3. System Screenshot: - it is Screens which represented the contains of academic conference system windows which interact with their users

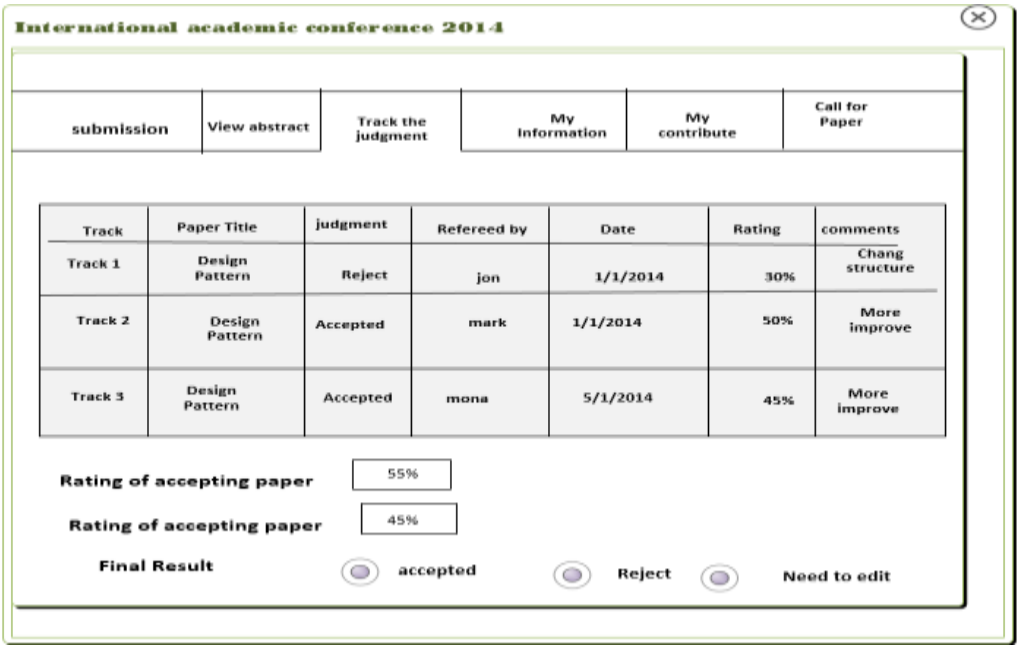
2.3.1. Main page:-this is the main page in the system which enable any user or any page visitor from check the general information of the conference and the most important activities in the conference the visitor can decide if he / she interested to attend or attribute in conference or no, moreover the page has more function which enable the visitor from log in, register, search, see the latest news of conference ... Etc.

2.3.2. Log in Screen: - this screen enables the user from access to system or no depends on log in details. the Access to the system is managed by a role of permissions which are specialty on the based on a user's type at the conference system for example: - all user Except administer user can access to specific data which relevant to their tasks and they cannot access to the administrative side of the system. In contrast, the conference administrators have permission to access to all data in the system. Moreover, this window has more function of the problem which faced the user when try to log in for example: -forget password, Register... Etc.

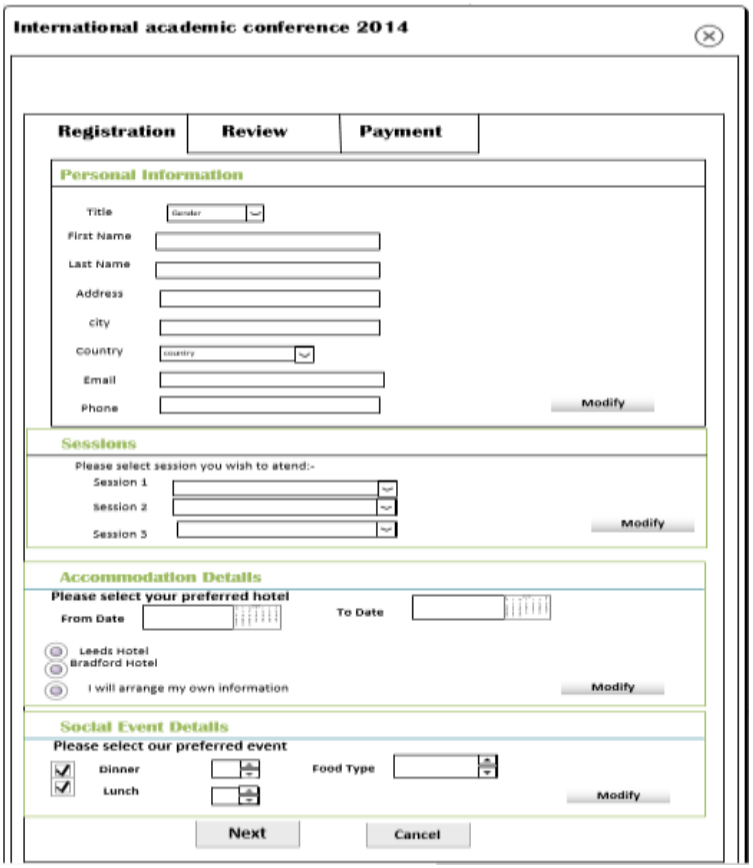
2.3.3. Submission Screen: - this window is specified the author to submit his / her paper



2.3.4. Track judgment Screen: -this window is specified the author to track the progress of evaluate the paper

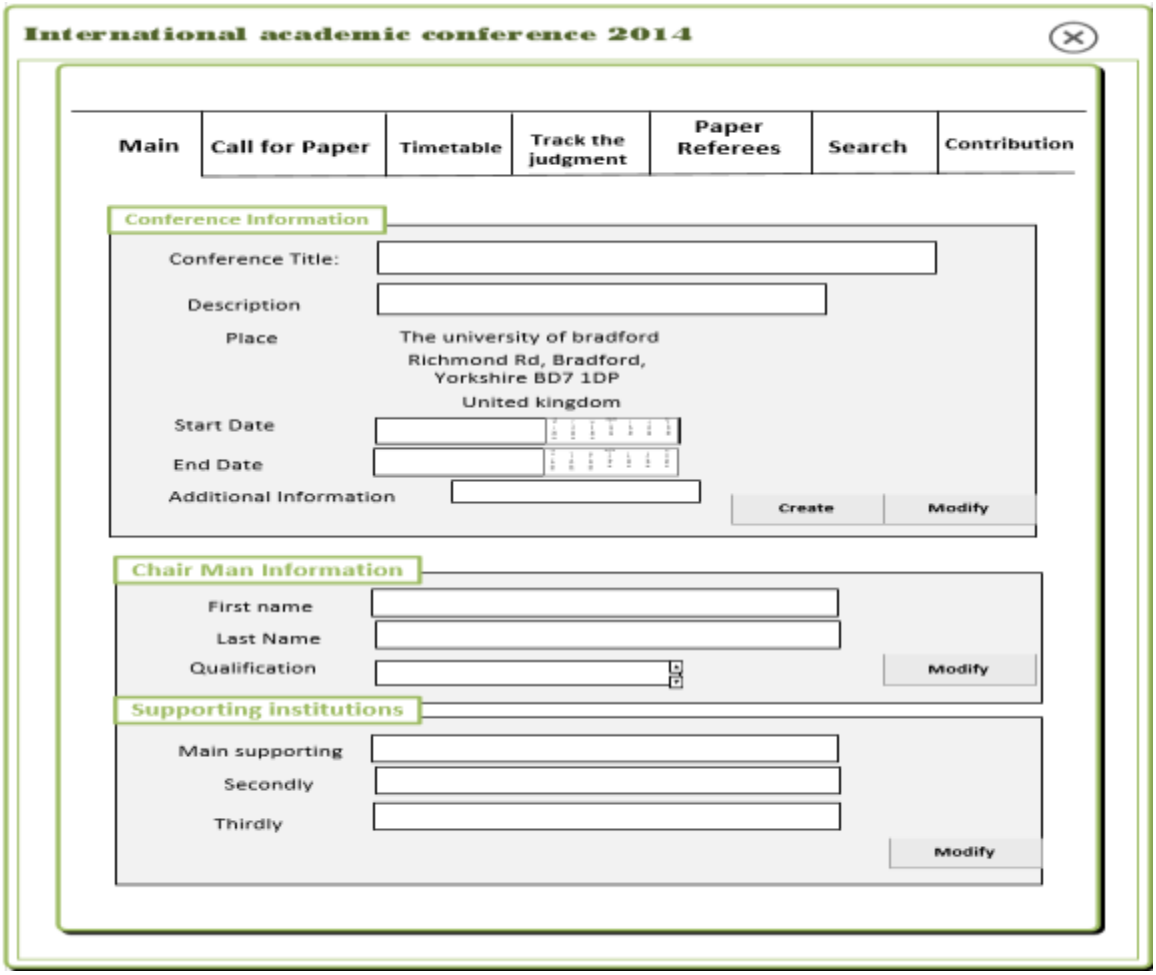


2.3.5. Register Form Screen: -this window is enabling the user from register in the conference depended on their requirements and their choice as you see in the window. To complete the registration at academic conference the user must be fill in own information then move to Review Screen which display participant details which was fill in last screen then can move to payment screen to pay the fees.



2.3.6. Payment page: - this last stage in registration steps which enable the participant from make payment depends on in their choice in registration.

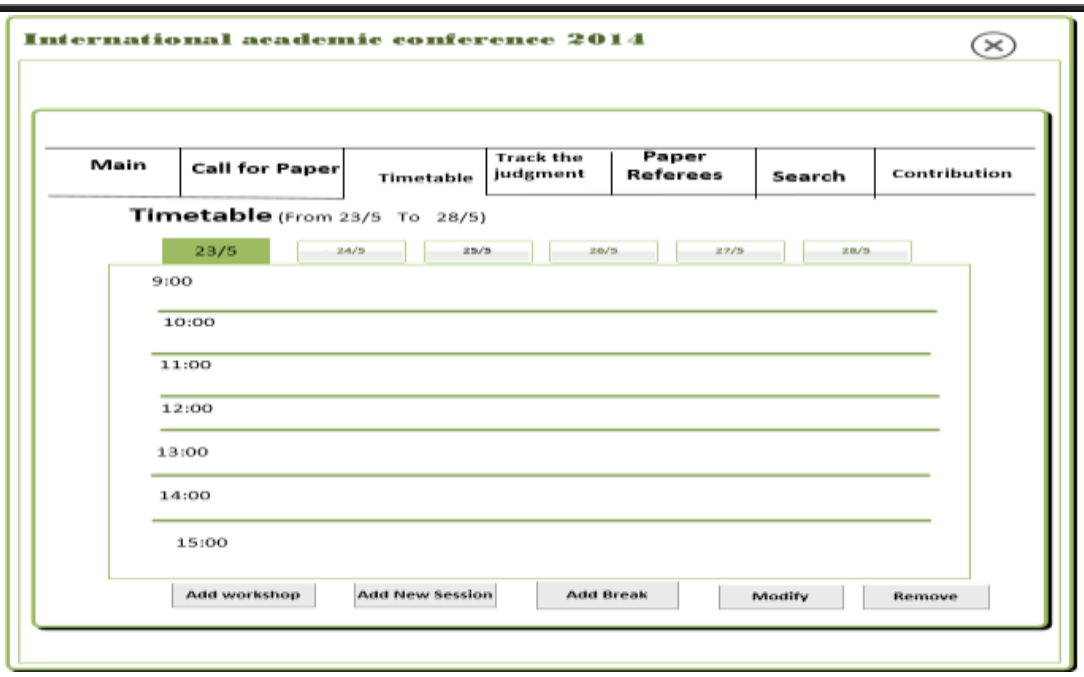
2.3.7. Conference information: -this page contains from the essentially information about the conference.



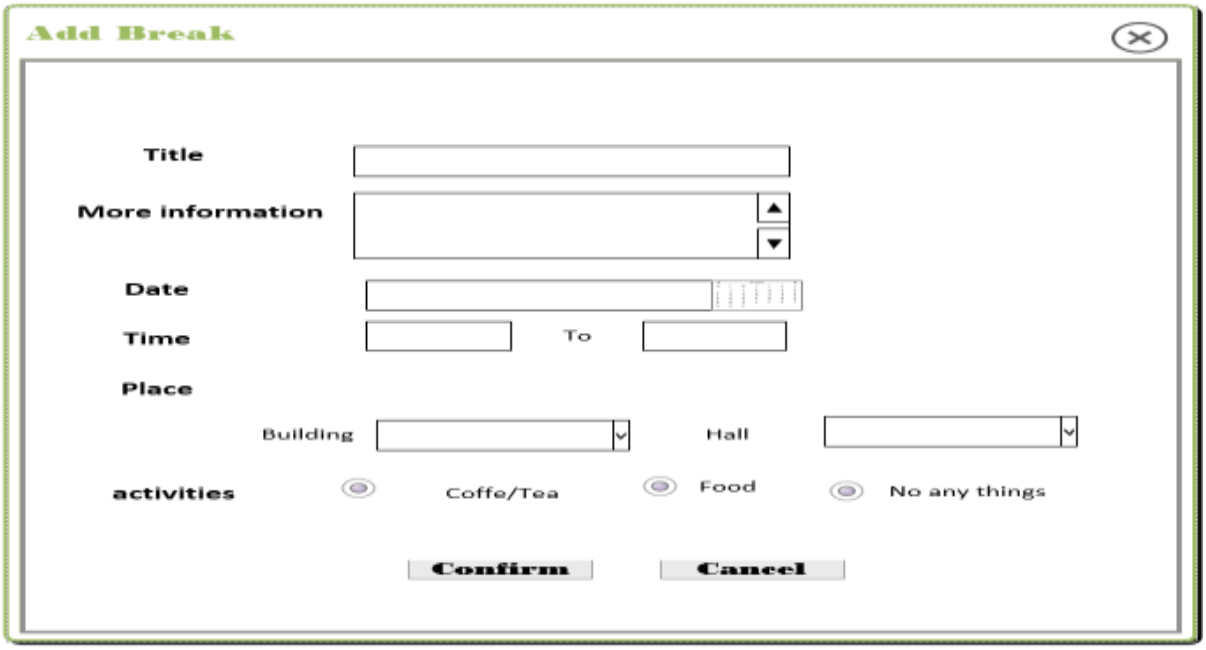
2.3.8. Call for paper Screen: -this window is specified the PC Chair which can enter and modify the information of the call and deadline of paper which related with conference.

2.3.9. Timetable Screen: - this page shows the timetable of conference which contains from essentially activities in conference and its time and place. There are three sub screens from this screen which are: -

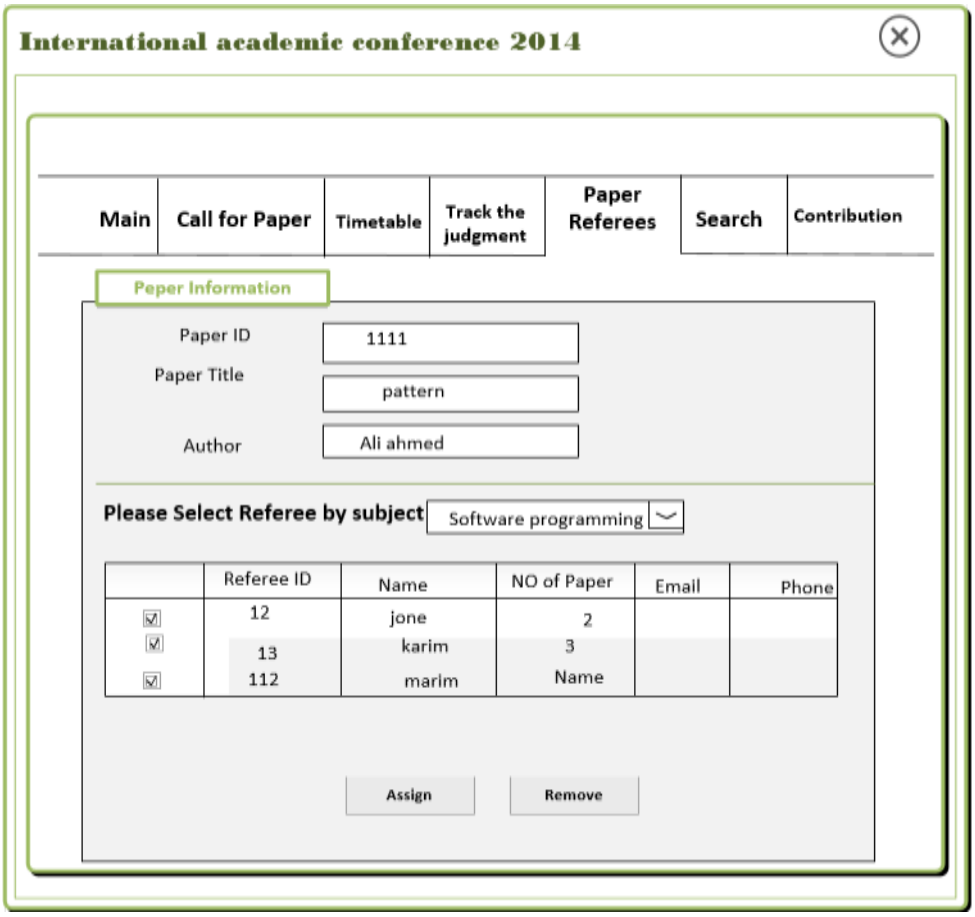
a) Add new session
b) Add break
c) Add workshop



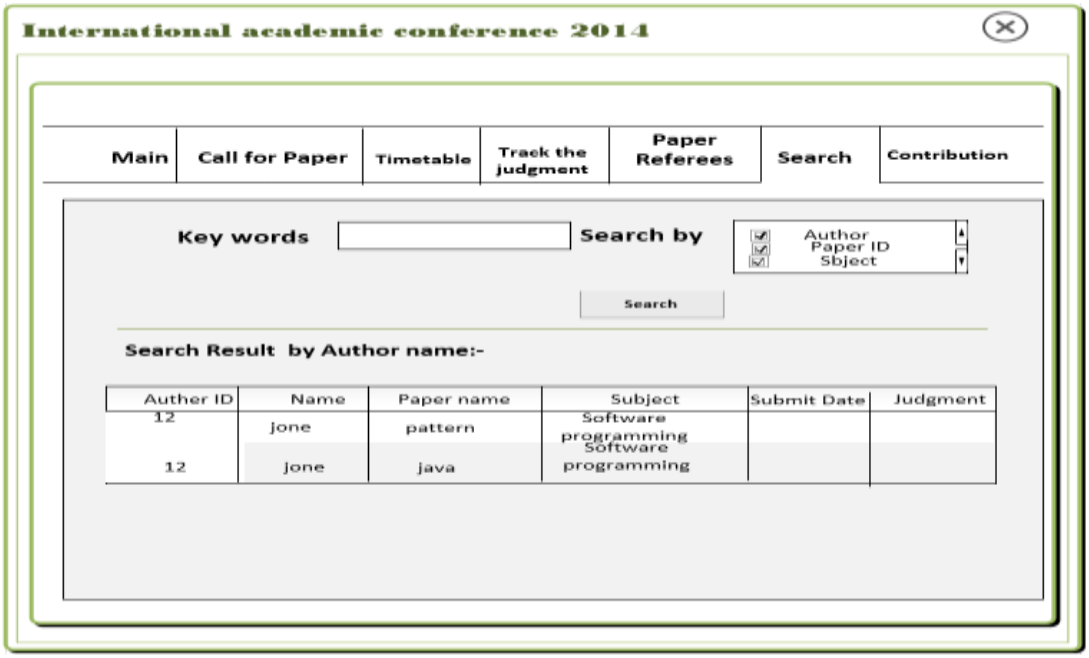
2.3.9. a. adds new session sub screen: -this is sub window from timetable window which enable PC Chair from add new session and its information



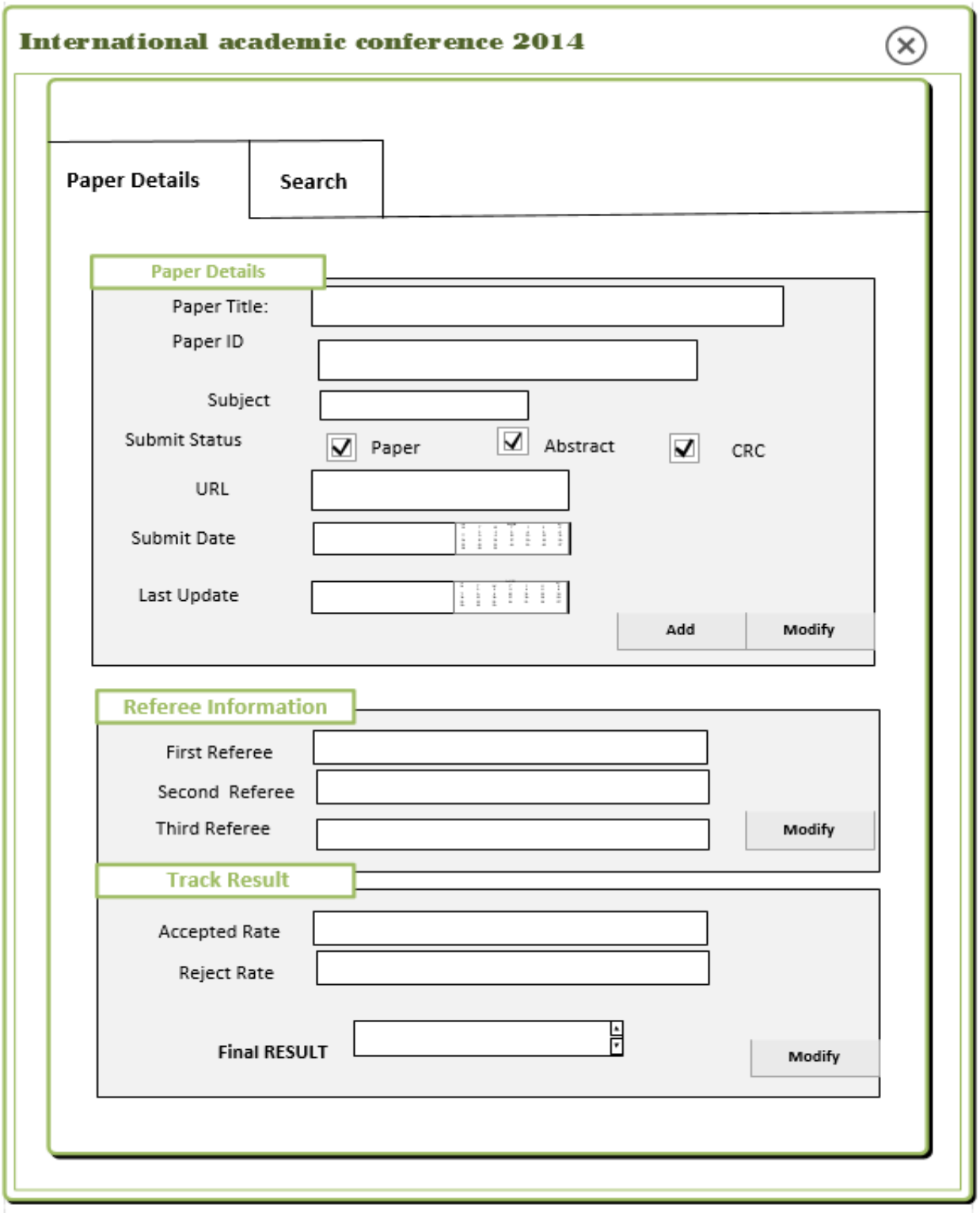
2.3.10. Paper Referee: - this window is specified the PC Chair which can help him to search referee by specific subject the assign the referee to specific paper.



2.3.11. Search Screen: - this important window which enable the user from search data by multiply and different criterion (author, paper ID, subject).



2.3.12. Paper Details: - when the author submit paper. The Pc member add paper details to system by this window.



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