Systems Modeling

Project Topic: Designing and Implementing Mancala Game

Group members:

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A Brief Introduction on Mancala Game:

Mancala is a family of board games played around the world. The word *mancala* comes from the Arabic word *naqala* meaning literally "to move." In the USA, however, "mancala" is often used as a synonym for the game **Kalah**.

- - Source: Wikipedia

Mancala Game Board

Guideline of the Project:

Key Responsibilities:
1. Writing 30 User stories
2. Drawing 40 Object diagrams
3. Preparing Class diagram (using Fujaba)
4. 15 Test cases
5. Writing the Project report
6. Preparing User manual, documented code and diagrams

Group Members:

- Naved Ahmed (B06118)
- Jabed Morshed Chowdhury(B06460)
- Inam Ullah Soomro (B06321)
- Naiad Khan (B06319)

Division of Responsibilities:

Naved
Involved in:

- Overall planning
- Class Diagram
- Java Coding
- Fixing bugs
- Guidance
- Troubleshooting

Inam
Involved in:

- Preparing Class diagram
- Java coding
- Test cases assistance
- Fixing bugs
- Troubleshooting
- Preparing User Manual

Jabed
Involved in:

- Planning and making object diagrams
- Testcases

Naiad

Involved in:

- Writing the Scenarios and derive the User stories
- Testing the project
- Writing the documentation

Required Software and Tools

- Jdk 6.0 or >
- Eclipse IDE for Java Developers(Helios Service Release 1)
- Fujaba plugin for Eclipse
- Dia for object diagrams
- Microsoft Office 2010s

Historic and Management Information:

Project Schedule

- The working on Mancala project will start from November 1, 2010.
- The project schedule was designed by assuming that the group members will perform their assigned works during the weekdays and at least 3 hours of work per day
- During the project work, 5 weekly meetings will be held by the group members on Monday, every week.

Schedule Chart

Weeks	Week 1					Week 2					Week 3					Week 4					Week 5	
Works / Days	M	T	W	T	F	M	T	W	T	F	M	T	W	T	F	M	T	W	T	F	M	T
Group Meeting	█					█					█					█					█	
Setting Git repository	█																					
Writing Scenarios		█	█	█	█																	
Program Coding		█	█	█	█	█	█	█	█	█												
Drawing Class diagrams		█	█	█	█	█	█	█	█	█												
Writing User Stories							█	█	█	█	█	█	█	█								
Drawing Object Diagram											█	█	█	█	█		█	█	█			
Bug Fixing				█	█		█	█			█	█	█	█	█	█	█	█	█	█	█	█

Description of the Meetings

First Meeting (1/11/2010)

Agenda:

- Division of responsibility
- Planning the schedule of project
- Setting a shared Git repository for each group members

- All member should play Mancala as many times as possible
- Naved starts coding from tomorrow.
- Inam will be making the class diagrams.
- Initially, Jabed will help Naved and Inam
- Naiad will start writing Scenarios

Second Meeting (8/11/2010)

Agenda:
- Checking all the 30 Scenarios by the group members
- Check the current progress and issues of Mancala GUI board
- Discussion about the class diagrams

Decisions:
- Naved will finish coding by next week.
- Inam will be finishing drawing all the class diagrams by next week.
- Jabed will start drawing Object diagrams
- Naiad will start writing User stories

Third Meeting (15/11/2010)

Agenda:
- Review of the User stories and propose suggestions
- Review of Object diagrams and the Class diagrams

Decisions:
- All group members will play Mancala-created by group.
- Group members will try to identify as many bugs as possible
- Naved and Jabed will perform the JUnit tests
- Note down the bugs

Fourth Meeting (22/11/2010)

Agenda:
- Discussion about the bugs which were identified in the last week and propose the solutions
- Synchronization between User stories, Use cases and the Object diagram

- A general review on Class diagram

Decisions:
- Naved and Inam will try to fix all the bugs found during the next week
- Inam will solve the inconsistencies in the Class diagram
- Jabed and Naiad will check and finalize the Object diagram, User stories and Test cases
- Naiad will write few additional Scenarios, User stories and Use cases and evaluate those by himself

Final Meeting (29/11/2010)

Agenda:
- Final review of overall project
- Final corrections on User stories, class diagrams and program code

Decisions:
- The whole project will be submitted on 30/11/2010 night

List of the User Stories

There are total 30 User Stories. These user stories are documented on the file named **'Mancala User Stories'**

1. Alex and Lisa input their names
2. Displaying the Mancala game rules
3. Initializing Mancala board
4. Alex starts the game and scores no point
5. Lisa scores one point
6. Alex completes a normal move and gets another extra move
7. Lisa completes a normal move and captures a cup of stones of Alex
8. Alex is now playing an extra move
9. Alex completes first extra move and gets another extra move
10. Lisa plays her second extra move and gets another extra move
11. Lisa plays her second extra move and gets another extra move
12. Alex's last stone falls into an empty cup and doesn't capture any stone
13. Alex captures a cup of stones of Lisa in his extra turn
14. Lisa finishes playing all her stones and Alex remaining stones added to his point

15. Alex wins the game when Lisa plays the last move
16. Alex loses the game when Lisa plays the last move
17. Lisa wins the game when Lisa plays the last move
18. Lisa loses the game when Lisa plays the last move
19. The game becomes a tie
20. Alex's last stone falls in Lisa's Cup
21. Game becomes tie, when Alex captures Lisa's stone
22. Alex wins with 36 points
23. Alex ends the game by capturing Lisa's remaining stones
24. Alex scores 2 points in a single move and gets an extra turn
25. Alex scores 2 points in a single move and does not get any extra turn
26. Alex resets the Mancala game
27. Alex and Lisa start a new Mancala game
28. Lisa closes the Mancala game
29. Alex sees the Mancala game history
30. Displaying Alex's and Lisa's Mancala game result

List of the Object Diagrams

There are 40 Object Diagrams prepared in this project. All these can be found in **'Mancala Object Diagrams'** folder. Each of the file names of the object diagrams is self-explanatory. The first part of each object diagram is referred to the pre-condition state and the second part is to the post-condition stage.

1. Alex starts the game and scores no point
2. Lisa scores one point
3. Alex completes a normal move and gets another extra move
4. Lisa completes a normal move and captures a cup of stones of Alex
5. Alex is now playing the extra move
6. Alex has completed an extra move and gets another extra move
7. Lisa has completed her second extra move and does not get another extra move
8. Alex's last stone falls into an empty cup and doesn't capture any stone
9. Lisa finishes playing all her stones and Alex remaining stones added to his Mancala
10. Alex wins the game when Lisa plays the last move
11. Alex loses the game when Lisa plays the last move
12. The game becomes a tie
13. Alex's last stone falls in Lisa's Cup
14. Lisa puts stone in her own cup after putting stones in Alex's cup
15. Alex puts 3 stones in Lisa's cup
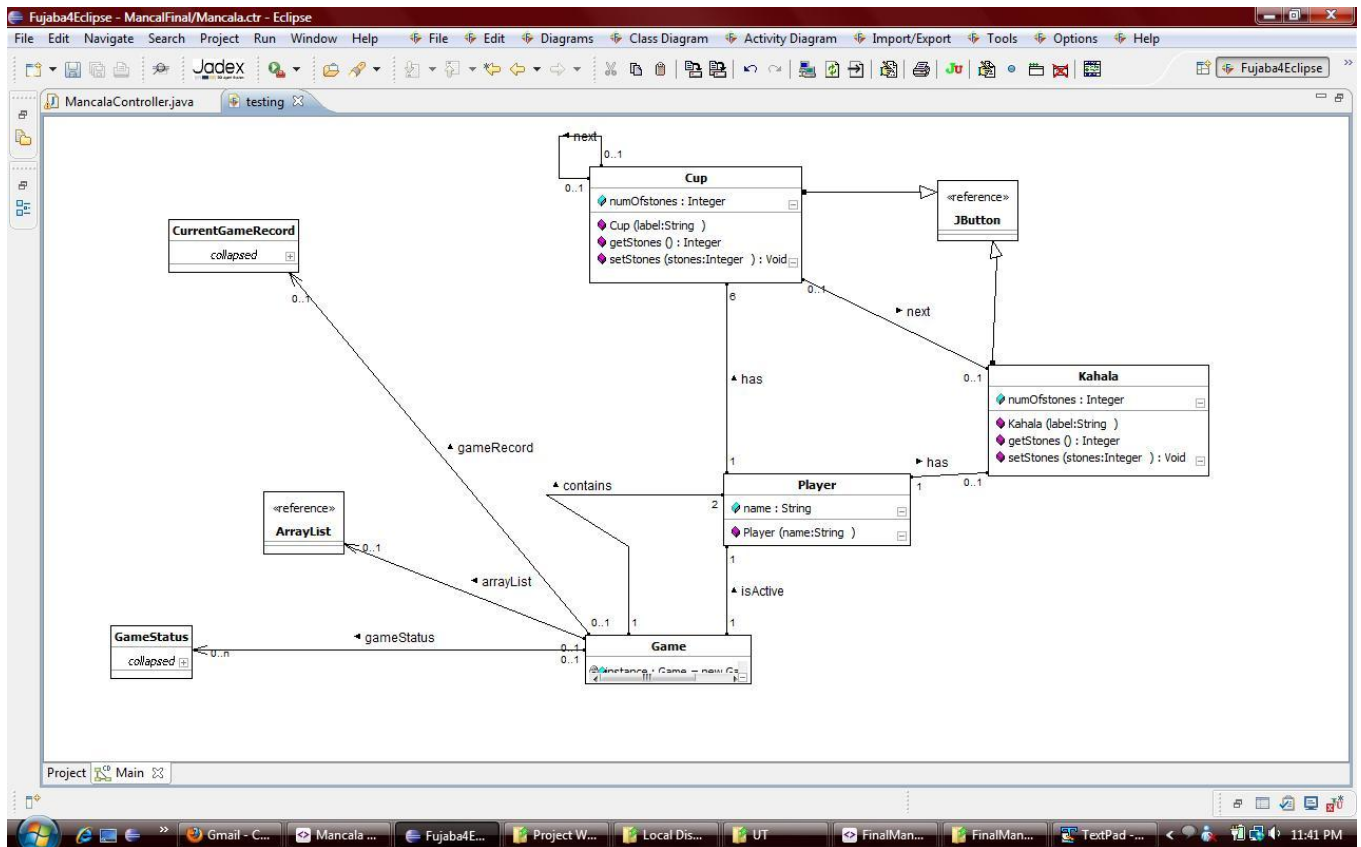16. Alex gets 4 consecutive moves

17. Alex ends the game by chaptering Lisa's stone
18. Game ties when Alex captures Lisa's stone
19. Alex gest 2 consecutive extra moves
20. Alex scores 2 without capturing Lisa's stones
21. Game finishes by capturing 3 stones and scoring 1 points
22. Lisa scores one point from 1st cup
23. Lisa captures stones   in 6th cup, starting from 1st cup
24. Lisa's last stone falls in 5th cup, no point
25. Lisa scores a point from 6th cup, last stones falls in Alex's 1st cup
26. Lisa scores one point from 5th cup
27. Lisa wins the game by putting last stone from 6th cup
28. Lisa loses the game by putting last stone from 6^{h} cup
29. Games is a tie when Lisa puts her last stone from 6^{h} cup
30. Lisa's last stone falls in 2nd cup, no point
31. Lisa scores one point from 4th cup
32. Lisa captures stones   in 5th cup, starting from 1st cup
33. Lisa captures stones   in 4th cup of Alex, starting from her 2nd cup
34. Lisa scores one point from 2nd cup
35. Lisa's last stone falls in 6th cup, no point
36. Lisa scores one point from 5th cup
37. Alex moves 1 stone to 4th cup.
38. Lisa gets extra turn by playing stones from 1st cup.
39. Alex ends up in Lisa's 3rd cup
40. Lisa moves stone from 3rd cup to 5th cup

Design Decision

- MVC pattern was used in the overall design pattern.
- Singleton pattern is used in design. We have implemented game as a singleton in our project.

Class Diagram

One major decision in our class diagram is that we have avoided the Turn object. We
have used 'isActive' attributes of game object to switch user's turn.