

## Design and Implementation of Online Mobile Game based on J2ME

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### Abstract

*Online mobile game is a hot industry. It is a comprehensive industry including program design, planning and art design. This paper analyzed JAVA program and mainstream game development environment, then developed a mobile game based on J2ME, including modeling design, architecture design, class.*

**Keywords:** *Game Design, J2ME, Online Mobile Game*

### 1. Online Mobile Game and J2ME

Online game's transmission medium is internet; its processing terminal is game operator server and user's computer; its information interactive window is game client software, in order to achieve individuality multimedia player online games. Online mobile game is mainly used in mobile game. It produced in the late 1990s. Originally set up a simple stand-alone game in the GSM mobile phone. With the rapid popularization of 3G technology and mobile terminals supporting 3G technology, online mobile games developed rapidly. Currently, in online mobile game's development, J2ME technology is mainly used.

#### 1.1. Online Game

Graphic image design has strong intuitive visual impact, which is an important factor in game design. In certain circumstance of phone terminal, desktop cannot be used. In the mobile phone network game development, the problems such as screen flicker, deadlock, image display and not enough storage often appear. We can avoid screen flicker by double buffering technology, solve deadlock by writing break point function, adjust the picture display by correcting screen coordinates, prevent memory leaks by memory management.

#### 1.2. Online Mobile Game

According to China's ministry of industry and information, China mobile phone users was 1.306 billion by the end of December 2015, and mobile phone penetration rate is 95.5%. With the popularity of the domestic 3g communication technology and the application of 4 g technology, online mobile game industry has broad prospects.<sup>1</sup>

The industrial chain of online mobile game has the following parts: Game Developers, Mobile terminal equipment manufacturers, Mobile operator, Mobile terminal users, Mobile phone game publishers. The Online Mobile Games on the market are of varying quality, and should be regulated. Our country has a certain gap with foreign countries in

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product quality, cultural innovation, project phoenix and variety of scenarios. The following is foreign famous game developers: Digital Bridges of Scotland, Sci Entertainment of England, Gameloft of France, JAMDAT of America, Sony-Ericsson of Japan, ZIO of Korea .In addition to that the game industry in our country starts relatively late, standards of domestic telecommunication operators are relatively high. It is important reason why China's online mobile game is limited.

### 1.3. J2ME Technology

The predecessor of Java is OAK, which developed to J2ME,J2SE,J2EE. As Java technology designed for systems custom version, Java2 Micro Edition (J2ME)[1],has become mainstream developing platform for mobile communication equipment. J2ME is widely used in consumer and embedded devices, has extensive value in electronic components of car, industrial automation, military astronautics, retail Merchandising, teledata, Information Automation and long-range control. Java can achieve function based on this platform. In theory, J2ME realizes 'write one ,run anywhere' environment. In the development process of concrete, the same game program is hard to run in different handsets. Mobile Brand and diversity of the configuration need to design multiple versions.

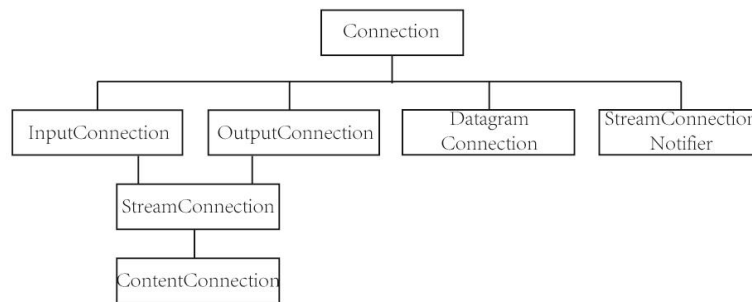


Figure 1. J2ME Generic Connection Framework

## 2. Design and Implementation of Online Mobile Game Based on J2ME

Online Mobile Game is made up of mobile client and end game information management. We adopt hierarchical development execution principles. Game information management in the data server at the same time manage different mobile game. Client implement view of MVC structure and control layer. Web Client is relative to the implementation of the view layer function. The other functions will be realized by the J2EE server.

### 2.1. System Framework Design

Mobile Client Modules: Using mobile phone game client developed by J2ME, responsible for the game logic operation and man-machine interface, and sends the user operation information through the module to the server . [2]

User Management Module: Developed by J2EE'S STRUTS, responsible for the user's registered users information management information and view the games to realize the user entity and J2ME client form the MVC.

Game Management Module: Responsible for the initialization of data in the game, and the game information communication interaction. We Use the SOCKET interface and J2ME client communication to minimize the communication latency.

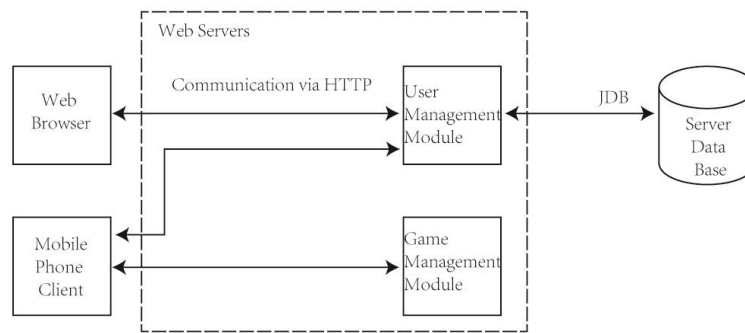
Database Module: As a game with hundreds of millions of potential customers, we use MYSQL as the database. In each aspect all can get good results, and has a certain capacity.

## 2.2. Client Function Module Design

**2.2.1. MVC Three Layer Development Framework:** MODEL is the core part of the application, including user instance and relevant logic flow; VIEW is used to connect the user interface and user interface tools; CONTROLLER handle user input data. The system task will be assigned to the MODEL service. The client support game view and the controller, Use communication interface and server for data communication. The client supports game view and the controller, and it communicates the data with communication interface.

WEB uses STRUTES, which is the implementation of the MVC three layer framework. Mobile game client and WEB share the same model. When data changes, you just need to modify the common model, to ensure the consistency of the system and maintainability.

**2.2.2. Class:** Mobile Phone Client is made of 5 different classes and one interface, The specific function is described below:

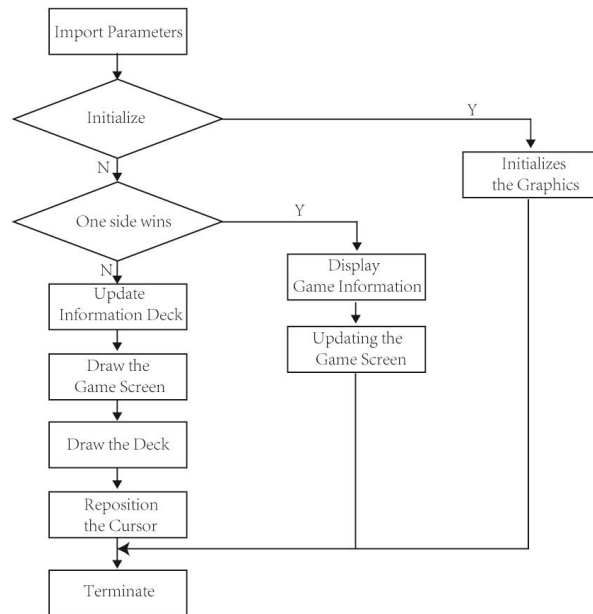


**Figure 2. System Software Architecture of mPoker**

1) The function of mPoker system class is to adjust the mobile game life cycle and state. There are three basic condition: startstatus, pasuedstatus, destoryedstatus. Running state is as shown.

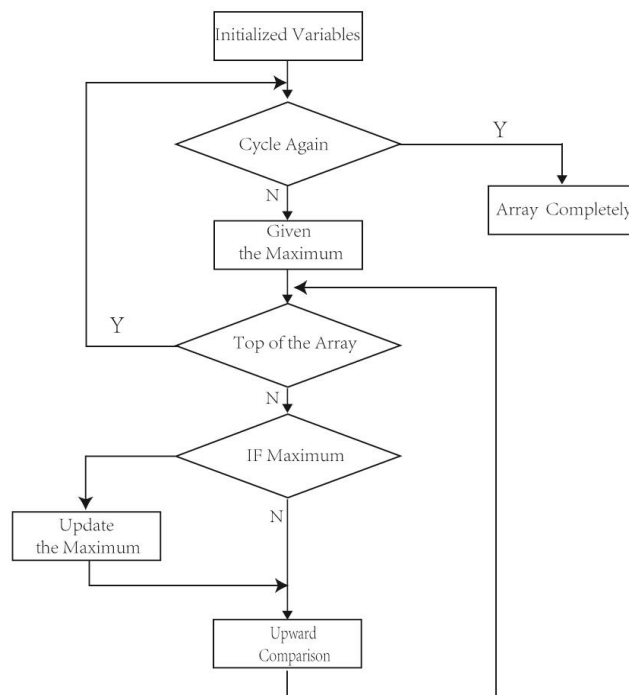
When the execution process, JAVA program's state virtual machine will calls different types constructor, set them as suspended state, running state of the relevant, canceled state.

2) PokerCanvans Class designs view, provides the basic game design interfaces to uses. It provides relevant command, relevant input time and game design's special interface. PokerCanvans has a buffer function, can put out view and image.



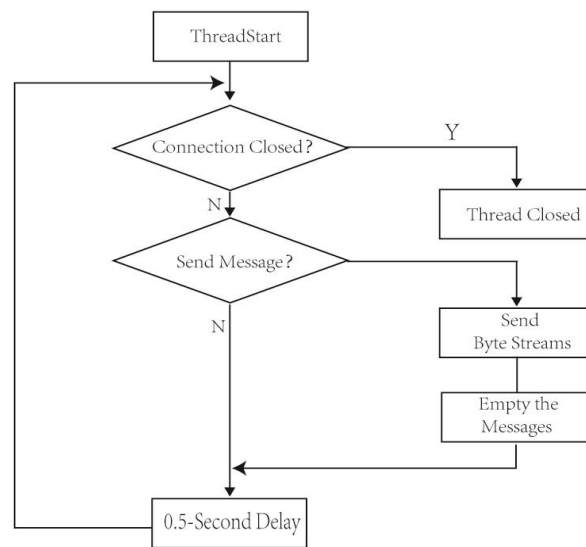
**Figure 3. The Diagram of Paint Method**

3) PokerCard receive information from the relevant communication class, and process it accordingly, encapsulate game user's data in detail. Data encapsulation encapsulate specific empirical data.



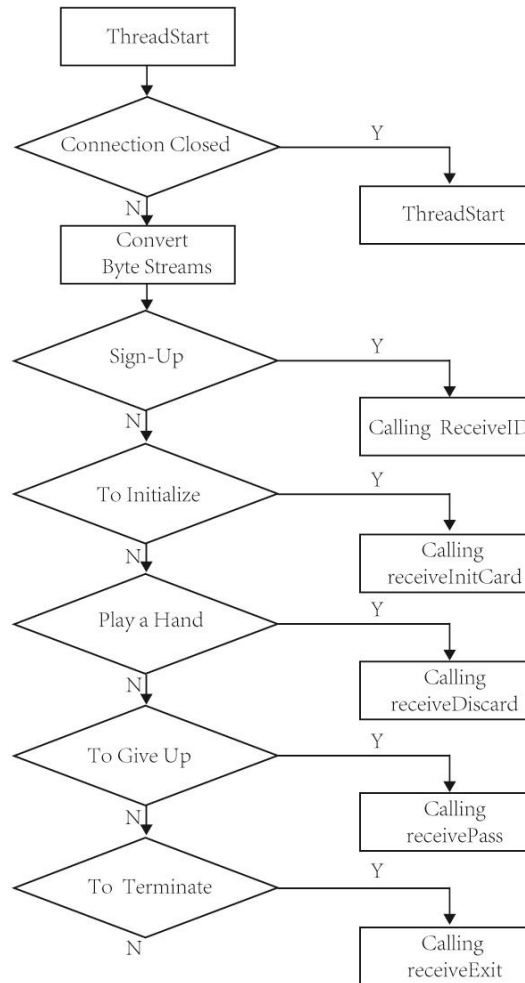
**Figure 4. The Flow Chart of Bubble**

4) Sendthread is CWinThread, which is the smallest unit of level in operating system. Sendthread can produce CWinThread, send start ( ) message to different thread object, until The run ( ) function returns the result.



**Figure 5. The Function Flow of SendThread Run**

5) Message Map system interface is essentially the interface. Interface includes functions or member variables, interfaces provide related functions. [3] We also can defines the interface function and member variables in an interface, for all the different common use Java interface. Message Map defines common standards between the game client and server perform.



**Figure 6. The Function Flow of GetThread**

The client uses Socket network programming, maintain the communication with customers, enter the game immediately after entering the login page, set the help menu, game interface and game interface. The program code is as follows:

```

public int card Check(string card){
    string pure card=" ";
    for(int i=0;i<card.length();i+=2){
        if(integer.parseInt(card.substring(I,i+2))==47)
            pureCard+=" 2";
        else
            pureCard+=cardRule.charAt(Integer.parseInt(car.substring(I,i+2)/4);
    }
    If(pureCard.length()==1)
        Return1;
    Else if (pureCard.length()==4){
        Int I;
    }
}
    
```

```
For(i=0;i<3;i++){
If(pureCard.charAt(i)!= pureCard.charAt(i+1))
    Break;
}
If(i==3)
Return4;
}
Else if (pureCard.length()==5){
If(pureCard.charAt(1)== pureCard.charAt(1)&& pureCard.charAt(3)==
pureCard.charAt(4)&& pureCard.charAt(2)== pureCard.charAt(1)
||pureCard.charAt(2)== pureCard.charAt(3))
    Return5;
}
If(roperule.indexOf(pureCard)!=-1&& pureCard.length()>=5)
    Return6:
Else if(pureCard.length()%2==0){
    Int I;
    String subCard=" "
    For(i=0;i< pureCard.length();i+=2){
    If(pureCard.charAt(i)!= pureCard.charAt(i+1))
        Break;
        subCard+= pureCard.charAt(i);
    }
    If(i== pureCard.length()&&pureCardRule.indexOf(pureCard)!=-1)
        Return 2;
    }
    If(pureCard.length()%3==0){
        Int I;
        String subCard=" ";
        For(i=0;i< pureCard.length();i+=3){

        If(pureCard.charAt(i)!= pureCard.charAt(i+1) || pureCard.charAt(i)!=
pureCard.charAt(i+2)// pureCard.charAt(i)!= pureCard.charAt(i+2))
            Break;
            subCard+= pureCard.charAt(i);
        }
        If(i== pureCard.length()&&CardRule.indexOf(subCard)!=-1)
```

```

    Return 3;
    }
    Return -1;
    }
    
```

### 2.3. Game Server Design

**2.3.1. Database Design:** The user to enter the account password and personal information to register, enter account and password to log in and view the game information. Database stores user's information in a database table. [4] Database server will store all interactive information in the data table. Structure of user's table is as Tab.1.

**Table 1. Users\_Table Structure**

Table 1. USERS\_TABLE Table Structure

Field	Type	Length	Explanation
ID	char	12	User ID
PASSWORD	char	8	User Login Password
USERINFO	char	128	The User's Personal Information According to the Game
GAMEINFO	uint	4	Record the User's Game Scores

**2.3.2. Business Logic Design:** A model function needs to complete the corresponding business logic process, including: Users use mobile game related page, fill out the registration information to complete the registration process. The game users enter the system, browse the user's information, or edit user information. The users access to the related database tables in a database, and update game user s' information.

**2.3.3. Access Data Base:** After user information results is saved into the database, system operates database by Utility Class. It are respectively dbutil and userbean. Dbutil establish a database connection, offer connect to db ( ) , in order to create a connection to database, return the connection of the return value. Userbean is on behalf of the user entity, including ID,PASSWORD,USERINFO and GAMEINFO.

**Table 2. Pokerserver Application user Interface and its Functions**

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Interface	Field	Type	Explanation
Welcome (index.jsp)	Null	Null	Provide login link to the welcome screen
Log In (enter.jsp)	userID,password	Strings	Editable
Register (login.jsp)	userID,password,userinfo	Strings	Editable
Display Data (display.jsp)	userID,password,gameinfo	Strings	Read-Only
Query Data (search.jsp)	userID,gameinfo	Strings	Editable
Main Menu Interface (enter.jsp)	Null	Null	Provide all operational menu
Registration ConFirmation (confirm.jsp)	Null	Null	Inform the user data added successfully

**2.3.4. User Interface:** Design concept of interactive interface realizes interactive functions with page mode.[5] Interactive interface includes user interaction function, user perform interactive information and the relationship of the user interface.



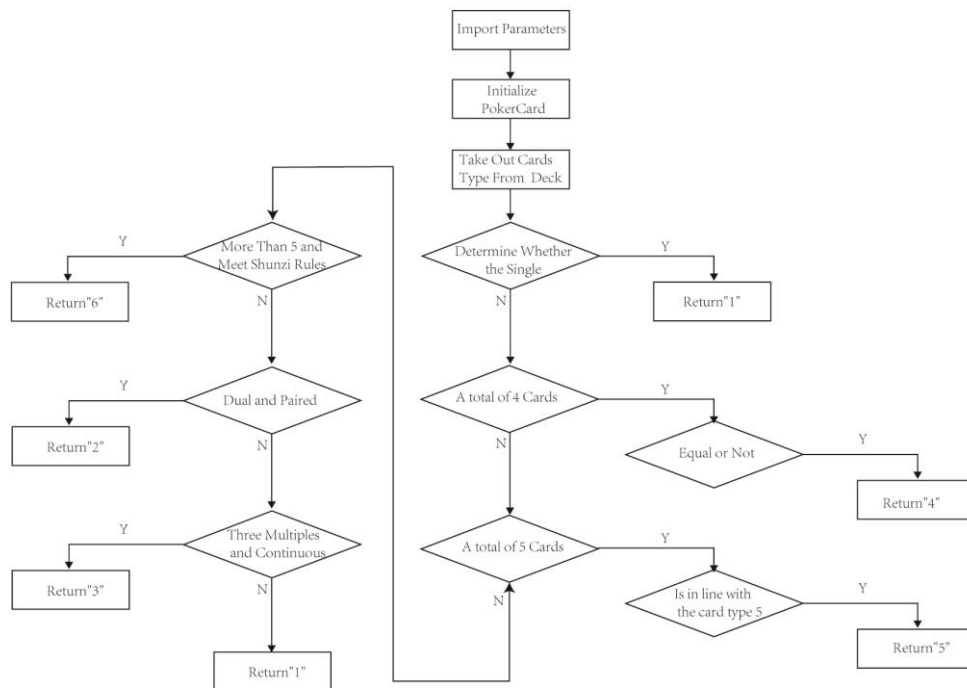


Figure 7. Card validity Test Flow

### 3. Conclusion

Online mobile game design and development is a comprehensive industry including program design, planning and art design. On the basis of a mobile network game case, this paper studied respectively from the user's client and game server focuses on two aspects of design, analyzed about the use of the five main Java class.

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