Algorithm Design on Network Game of Chinese Chess

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***Abstract*—This paper describes the current situation of domestic network game. Contact the present condition of the local network game currently, we inquired to face to a multithread tcp client and server, such as Chinese chess, according to the information, and study the contents and meanings. Combining the Java of basic knowledge, the article study the compiling procedure facing to the object according to the information in Java Swing usage, and the method of the network procedure. The article researched the method and processes of the network procedure carry on the use of Sprocket under the Java Swing. Understood the basic process of compiling procedure using Java and how to compile a network procedure. The most importance is how a pair of machines correspondence—C/S the service system—is carried out. From here, we put forward the data structure，the basic calculate way of the network game- Chinese chess, and how to design and realize the server and client of that procedure. The online games -- chess design can be divided into several modules as follows : server module, client module and the control module.**

Keywords-java; multithread; Chinese chess; communication

I. INTRODUCTION

As the Internet has improved steadily, Java programming in the game gradually revealed the powerful features, particularly its robustness and cross-platform type and its applications in the network the power is used to make various types of game development. Such as mobile phone games based on J2ME, Java Applet or Java Swing-based multimedia games, online games based on J2EE architecture, etc. [2]. The design is based on C / S to achieve a simple double play chess - Network Chinese Chess application. The game uses the eclipse development tools. The chess game offers network support, LAN networking in the game, the chess game on the other two players not in the state, but rather one of providing services to another person; but the chess game to set the server and client in one, that is, either the same application can also choose to select a server as a client. And that the chess set also has the function of throwing in the towel and background [3]. Specific use as follows:

Server-side: Open Applications -> Start the server

Client: Open Applications -> Link -> enter the server IP address

Then there will be a pawn to play against can be. This game can also change the background. You can have the image files in the computer choose your favorite pictures.

This article based on the design and implementation of a C/S service routine double play chess games, users can Internet, and other online users in battle. The system is built on Windows XP platform, using the eclipse of the development tools.

Although this design is a game, but it is our understanding of Java programming language and its concrete has an important role. Because it involves not only the Java Swing, also involves a network of knowledge - TcpSocket, involving a very wide range of content, but also conducive to the understanding and use of Java programming.

Online game service program designed to consider many details of the problem, how to design simple and clear is a need to study of the problem. The design is based on message response mechanism and object-oriented design of service programs, so that the server and client programming simple and clear, and the implementation details of each package to achieve the object inside, object implements its own specific features . Simple structure of the whole system, server and client to achieve a more generic program model.

The client - server architecture, the server usually in a passive state, waiting for various requests of customers, and the server is triggered by the message and message response mechanism to complete its work. So how to properly design the architecture of server-side programs to meet the needs of the application is particularly important.

In our design the structure of the service program, focusing on the client to consider the server response message, and to respond to a request submitted to operate a particular object, the system architecture rather clear and easy to expand.

II. THE CLIENT / SERVER MODEL

In the TCP / IP network communications between two processes is the main mode of interaction between client / server mode (Client / Server model), the customer service request to the server, the server receives the request, provide appropriate services. Client / server model builds on the following two points: first, to establish the cause of the network is the network hardware and software resources, computing power and information inequality, need to share, thus bringing the total number of resources with the host to provide services to customers with fewer resources request service role of the non-reciprocal. Secondly, the interconnection process communication is completely asynchronous, inter-process communication between parent-

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child relationship does not exist and, without shared memory cache, requiring a mechanism for the wish to establish communication between processes to establish contacts for data exchange between the two provides synchronization, which is based on client / server TCP / IP.

Client / server model adopted during the operation mode is an active request.

(1) server side first start, and, upon request, provide the corresponding service.

(2) Open communication channels and inform the local host, it is willing to address in a recognized receiving client requests.

(3) waiting for client requests arrive at the port.

(4) receive customer service requests, process the request and sends response signals. Receive and send service requests to

Activation of a new process to handle the customer request. Deal with this new process customer requests and do not need to make response to other requests. Service is completed, close the new process of communication links with customers and end.

(5) back to Step 2 and wait for another customer request.

(6) shut down the server.

Client-side implementation is as follows.

(1) open communication channels, and connect to the server where the host-specific port.

(2) service requests to the message sent by the server, wait for and receive a response; continue with the request.

(3) After the close the communication channel request and terminated.

We can see from the above description: the role of client and server process non-reciprocal, so encoding different. Server process

General realization of handling customer requests initiated. As long as the system is running, the service process, there has been, until the normal or forced termination.

Server program usually listen in a well-known address of the request for services, that process has been in a dormant state until a customer's address for the service made the connection request. At this moment, the service program is "wake up" and provide services for customers - the customer's request to make an appropriate response.

III. THE BASIC FRAMEWORK

This section focuses on those used for the user interface.

A. Form Design

Game interface using Java Swing API function implementation, in the design of the Chinese chess board as a coordinate system to the lower left corner for the origin of coordinates, the board of the rows and columns are the x-axis coordinate system and the y-axis to the board on coordinates of each small cell, as a unit, the board were drawn horizontal, vertical, tips on both sides of the board coordinates, generals zone and river community. In programming, the first of all pieces are numbered, the board is shaping the content of two-dimensional array to mark the array subscript that the board position (coordinates), if the current position of the pieces on the value of the array element The number of pieces, and 0 otherwise. Array length is 90 (Chinese chess cross-cutting a total of 9 × 10 points). Modify the contents of the array every step, while the contents of the array to the Board re-painting surface.

B. chess records

Linked by a number of objects, called nodes of a data structure, data, and each node contains a reference to the object the next node (single list), or contains a data object contains a reference to the previous node and the next Node object reference (doubly linked list). The chess game is to use the form to record list. First, create a linked list, and then use the add () method to add nodes chess, chess records every step, and finally stored in the file. Read the data, according to the order list to read chess.

C. Add a bitmap resource

The chess game requires a lot of bitmaps, such as the dialog background, the chess board and chess pieces are all used to act as a bitmap. It is necessary to import the required bitmap. In addition, the chess game also can replace the background color, the code is as follows:

```
if (evt.arg.equals (ChessArray.menu1 [0] [i])) (
ChessArray.img = Toolkit.getDefaultToolkit (). GetImage ("checkerboard pattern \ \" + ChessArray.menu1 [0] [i] + ". Jpg");
ChessArray.repaint = true;
ChessArray.information ("image has been loaded;" + ChessArray.information);
return true;
)
if (evt.arg.equals ("Other ..."))
(
String Sbak = ChessArray.information;
ChessArray.information ("Open File dialog box is, please wait ......");
FileDialog fl = new FileDialog (new Frame (), "select the checkerboard pattern", 0);
fl.setBounds (width / 4, this.height / 6, width / 2, height / 3);
fl.show ();
ChessArray.information ("Please select your desired pattern");
ChessArray.img = Toolkit.getDefaultToolkit (). GetImage (
fl.getDirectory () + fl.getFile ());
ChessArray.repaint = true;
ChessArray.information ("image has been loaded" + Sbak);
return true;
)
```

IV. THE BASIC ALGORITHM OF CHESS

A. chess board structure

First, the board into a bitmap format of the board shown in Figure 3-4. (Including painting of "m" word box at the called "Nine-palace.")

Board structure is a two-dimensional array chArray [10] [9]. First on the board initialization, the initial array of zero chArray [10] [9] = 0. Then initialize the pieces, which pieces in the board position corresponding label:

Black:

chArray [0] [0] = chArray [0] [8] =- 1;

chArray [0] [1] = chArray [0] [7] =- 2;

chArray [0] [2] = chArray [0] [6] =- 4;

chArray [0] [3] = chArray [0] [5] =- 5;

chArray [0] [4] =- 6; / / will be

chArray [2] [1] = chArray [2] [7] =- 3;

chArray [3] [0] = chArray [3] [2] = chArray [3] [4] = chArray [3] [6] = chArray [3] [8] =- 7;

Hong Qi:

chArray [6] [0] = chArray [6] [2] = chArray [6] [4] = chArray [6] [6] = chArray [6] [8] = 7;

chArray [7] [1] = chArray [7] [3] = 3;

chArray [9] [0] = chArray [9] [8] = 1;

chArray [9] [1] = chArray [9] [7] = 2;

chArray [9] [2] = chArray [9] [6] = 4;

chArray [9] [3] = chArray [9] [5] = 5;

chArray [9] [4] = 6;

B. chess moves of the pieces to determine

(1) Chess rules

1) The game, by the party to go first red roles, each taking a turn with both sides, until the separation of win, loss, and, game

The end. Turn to turn to move the party to a piece from one intersection to another intersection, or eating each other's pieces and the occupation of their intersection, are considered a significant walk. With each side taking a called a round. When one side attacks the other handsome pieces (to be), and a must eat it in the next, known as "according to" or simply "will." "According to the" do not have to declare. Be "according to" the party must immediately "should", that is the law with their own to resolve is "will" state. If it is, "according to" and not "should", even if is "to die" [9].

2) various pieces of the moves

Shuai (to be): Shuai and will be the head of chess, the goal is that both sides strive to compete. They can only go anyway, and can not

Out of the nine palaces outside.

Shi (Shi): Shi (Shi) is a handsome bodyguard, it can only move in nine palace. It can only be a line of chess path

Nine intrauterine slash.

Phase (as): phase (as) the main role is defense, to protect their commander (to be). It is the walk through on the angle every time

Take the two cell lines, commonly known as "like walking fields."

Cars: the most powerful car in chess, whether horizontal, vertical can walk, as long as no child block, the number of steps is not limited.

Therefore, a car can control 17 points.

Guns: guns in the walk and when children do not eat exactly the same car. However, if you want to eat the child, between the child eat it

Must be separated and only a pawn. Commonly known as "gun rack" or "gun fight Gezi."

Malaysia: Malaysia has been moving way is a ramp, which is to go straight sideways, or a grid, and then go sideways a diagonal

Commonly known as "horse to go on."

Soldiers (soldier): Soldiers (death) of the line of chess rules of chess in China is the most complex. Bing (death) into the line chess rules \Two situations: one is the piece did not cross the river boundary; the other is across the river border pieces. So the soldiers (and death) of the line chess algorithm to determine when the first did not cross the river in the world. In addition, the soldiers (and death) can only move one grid, and the soldiers (and death) can not turn back.

V. CLIENT AND SERVER COMMUNICATIONS

As the design is online games, is based on the client - server model, so the most important thing is how to master - off the communication between servers, that double-machine communication. This program uses to achieve double Socket socket communication. This section contains two: Server Client blocks and blocks, one for each thread. In the design corresponds to the ChessServer class and ChessClient class. When you click the menu "Game" item, start the game. When you select "Identity" → "banker", the use of a Server block, waiting for the other side of the connection; When you click the menu choice of "identity" → "Challenger" item, the use of a Client block, with in connection the other party.

Server side and client-side TCP socket connection is used and the network connection to achieve, but the server side and client-side can be good communication, the ability to send various commands and requests are dependent on the server and client communication between the data structure and communication protocol.

(1) communication data structure

Server and client communicate using the specific data structure for communication, first need to define a data structure types. And stored in ChessArray class. File the statement are defined as follows:

public static boolean sORc;

public static boolean countOR;

public static boolean readyIn = false;

public static boolean readyOut = false;

public static boolean change = false;

public static boolean netChange = false;

(2) the communication process

Server and client to be able to communicate well and be able to respond to each other's request, the server and client must have a complete set of protocols. In this way, the server side and client-side to the other person's request, and make the appropriate action.

Server identifies the client commands are: user request a connection request, the user required to withdraw the request and so on.

Server can send a message to the client are: server down message, the server opens the message, the user's move news.

VI. CONCLUSION

This game is based on the server module, client module and control module is in the design view, which were used in some of the knowledge of network programming, mainly in the use of the Java Socket programming. The design of the most important are the following:

(1) chess overall data structure, including how to represent the board and chess. This design is a two-dimensional array

Said.

(2) Communication: As the design is based on the network, which is online play, so the communication between two computers, especially

Important. This includes server and client in two parts. Server is used to establish connections and deal with various requests. The key is to request the client to send commands to connect and make some judgments.

In the development process, encountered some difficulties. For example: server and client communication problems between its threads

Synchronization problems. To address these issues, the introduction of the keyword synchronized to solve the synchronization problem of data corruption occur. Is to use the synchronized modifier, indicating that the object at any time only one thread access; When a thread enters synchronized method, to ensure access to this in any way other threads to complete their implementation; if a thread tries to access an already started the synchronized method, then the thread must wait until the thread has been started is completed, the release of the synchronized method. Thus, to solve the above two issues. Makes the design can proceed smoothly.

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