

**Assumptions:** It is assumed that there is a reliable medium over which the packets are being sent.

1. First Compile All the Classes: "QuestionHandler.java", "GameServerUDP.java", "GameClientUDP.java", IpHandler.java"
2. Run GameServerUDP.java

Details: GameServerUDP.java is the UDP server and uses the QuestionHandler.java class to get questions to ask to the client and to validate client's response. The server does not stop running when the client ends the game however, when the client restart their application i.e. (GameClientUDP.java) the server goes to its original state i.e. It resets everything so that the client would start a new game.

The QuestionHandler class have methods that are used in GameServerUDP.java, these are listed below:

First Create a QuestionHandler object:

```
private QuestionHandler question = new QuestionHandler();
```

The methods used:

- question.ask()// This function call returns a question from the list of questions
- question.checkAnswer("Some response from client ");// This function call returns a string stating whether the response given was correct or incorrect
- question.isAvailable()//This function call returns a Boolean value of true if the question is available and false otherwise, a question is available if the queue is not empty or all the questions have not been asked already.
- question.getPoints()// This function call returns the number of points that would have been gained so far for each correct answer to each question asked.

The GameServerUDP class also uses a method from the IpHandler class to check whether or not a given Ip address exists on an Ip Block list:

First create IpHandler object:

```
private IpHandler ClientIPs = new IpHandler();
```

The method used:

- ClientIPs. blockcheck("Some Client IP Address");  
// this function call returns true if client Ip in block list and false otherwise

For this application the IP block list is contained in a text file called restricted.txt, each IP address in this text file must be placed on a new line. If a client that tries to connect to the server has its

IP address existing within the restricted.txt file, then this client would receive a message indicating denial of access to the server.

3. Then Run GameClientUDP.java

Type Stop to exit the game otherwise the Game ends after all questions have been asked including the ones on the queue from the server.

Details: When GameClientUDP.java is run the client/user receives the first question without having to enter input into the console, this is because the code does this on the users' behalf and the server responds with a new question. Each time the user gives a response to a question the server intern respond with a verification status of whether the answer giving was correct or incorrect along with the correct answer if the answer the user gave was incorrect. Along with the verification status, the server also sends the new question to the client to be asked. If the user types stop into the console the game would end and the score the user received so far would be displayed, however if the user completes the game then their final score would be displayed in the console. GameClientUDP.java also provides a "PrepareStringforByteConversion ()" function, that takes in a string and ensures that the client does not attempt to send completely incorrect request to the server.