**Design Document**

**Introduction**

Rock-Paper-Scissors is a two player children game where each player simultaneously displays symbols for: rock, paper or scissor. The winner is determined as follows: Paper beats rock, rock beats scissors, scissors beats paper; all other combinations are a draw.

The objective of this project is to write a client-server program that uses connection-oriented sockets.

**Data Structures**

The program uses an array to play the best n out of m rounds of the game. The arrays are randomly selected to be 2 out of 3, 3 out of 5, 4 out of 7, or 5 out of 9 rounds.

**Functions**

There are 4 functions for playing the game and printing the result of who won the round and the game overall in the screen. They are:  
waitForExit(): reads in the argument to determine if the program needs to be terminated

winner (): takes in the parameters for the input of user and computer and compares them to determine the result for the round.

convertNumber(): takes in an integer value and converts into a string named rock, paper or scissor

randomChoice(): a function to randomly select the number of rounds to be played and determine the number of rounds a user should win to win the overall game.

**Main Program**

In the client-side main program, a socket is created, and server address is received. The created socket is then connected to the selected server. The user input is received and sent over to the server to compare with the computer’s input. In the server-side main program, the user’s input is received and compared with the input for the computer. The computer’s input is generated using a random number generator. The two values are compared, and the winner is determined.

**User Document**

The program contains several files which are located under the folder Project3, the files are:

ServerC.c and ServerG.c for the server-side socket programming

Client.c for client-side socket programming

To compile and run multiple files, we create a make file as follows:

|  |
| --- |
| Makefile: |
|  |  |
|  | all: serverC serverG client run |
|  |  |
|  | serverC: ServerC.c |
|  | g++ ServerC.c -o serverC -pthread -std=c++0x |
|  |  |
|  | serverG: ServerG.c |
|  | g++ ServerG.c -o serverG -std=c++0x |
|  |  |
|  | client: Client.c |
|  | g++ Client.c -o client -std=c++0x |
|  |  |
|  | run: serverC |
|  | ./serverC |
|  |  |
|  | clean: |
|  | rm -f serverC |
|  | rm -f serverG |
|  | rm -f client |

To run the make file, simply enter:

make all

then, run ./client simultaneously in another two terminals.

This would allow the clients and server connection and the program can execute.

A run of the program might look like this:

Text

Description automatically generated

**In terminal 1**

$ make all

g++ ServerC.c -o serverC -pthread -std=c++0x ^

g++ ServerG.c -o serverG -std=c++0x

g++ Client.c -o client -std=c++0x

./serverC

Pthread created

bind

listening

-- NEW CONNECTION --

Reading from ServerG

Child ID: 30048

toServerG :5

toServerC :8

Response: ServerG initialized

listening

-- NEW CONNECTION --

Reading from ServerG

Child ID: 30056

toServerG :5

toServerC :10

Response: ServerG initialized

listening

Child (serverG) 30048 terminated

Child (serverG) 30056 terminated

Text

Terminal1

**In terminal 2**

$ ./client

ServerG Initialized

Game is 3 out of 5 rounds..

Enter one of the following:

1 ~ Rock

2 ~ Paper

3 ~ Scissors

:: 1

Computer chose: Paper Player Chose: Rock

Computer Wins

Computer Wins: 1 Player Wins: 0

Enter one of the following:

1 ~ Rock

2 ~ Paper

3 ~ Scissors

:: 1

Computer chose: Scissors Player Chose: Rock

Player Wins

Computer Wins: 1 Player Wins: 1

Enter one of the following:

1 ~ Rock

2 ~ Paper

3 ~ Scissors

:: 3

Computer chose: Paper Player Chose: Scissors

Player Wins

Computer Wins: 1 Player Wins: 2

Enter one of the following:

1 ~ Rock

2 ~ Paper

3 ~ Scissors

:: 2

Computer chose: Paper Player Chose: Paper

It's a tie

Computer Wins: 1 Player Wins: 2

Enter one of the following:

1 ~ Rock

2 ~ Paper

3 ~ Scissors

:: 1

Computer chose: Paper Player Chose: Rock

Computer Wins

Computer Wins: 2 Player Wins: 2

Enter one of the following:

1 ~ Rock

2 ~ Paper

3 ~ Scissors

:: 1

Computer chose: Paper Player Chose: Rock

Computer Wins

Computer Wins: 3 Player Wins: 2

The computer wins the game

A screenshot of a cell phone

Description automatically generated

**In terminal 3**

$ ./client

ServerG Initialized

Game is 2 out of 3 rounds..

Enter one of the following:

1 ~ Rock

2 ~ Paper

3 ~ Scissors

:: 3

Computer chose: Rock Player Chose: Scissors

Computer Wins

Computer Wins: 1 Player Wins: 0

Enter one of the following:

1 ~ Rock

2 ~ Paper

3 ~ Scissors

:: 2

Computer chose: Rock Player Chose: Paper

Player Wins

Computer Wins: 1 Player Wins: 1

Enter one of the following:

1 ~ Rock

2 ~ Paper

3 ~ Scissors

:: 1

Computer chose: Rock Player Chose: Rock

It's a tie

Computer Wins: 1 Player Wins: 1

Enter one of the following:

1 ~ Rock

2 ~ Paper

3 ~ Scissors

:: 2

Computer chose: Scissors Player Chose: Paper

Computer Wins

Computer Wins: 2 Player Wins: 1

The computer wins the game

Text

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