YAHTZEE

A DICE GAME

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CSC/CIS 5

45744

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INTRODUCTION

This documentation provides an overview of a Yahtzee game implemented in C++. It covers the game's mechanics and programming approach.

HOW THE GAME WORKS

Yahtzee is a dice game where players roll five dice and attempt to achieve specific combinations to score points. The game involves rolling dice, holding some dice while re-rolling others, and calculating scores based on various combinations.

OBJECT OF THE GAME

The objective of the game is to accumulate the highest possible score by rolling five dice and achieving various scoring combinations over a series of rounds.

RULES OF THE GAME

1.Roll five dice and attempt to achieve the best combinations for points.

2.You can roll the dice up to three times per turn.

3.Specific combinations like Yahtzee, Large Straight, and Four of a Kind have different point values.

GAMEPLAY MECHANICS

•Rolling Dice: The player rolls dice that are not held.

•Holding Dice: The player can choose to hold specific dice between rolls.

•Scoring: Points are awarded based on the combinations rolled.

MY APPROACH TO THE GAME

The game was implemented with a focus on simplicity and user interaction. The program allows for saving and loading game results.

SIMILARITIES TO THE ORIGINAL GAME

•Dice rolling and holding mechanics are similar.

•Scoring combinations and their point values match the traditional Yahtzee game.

DIFFERENCES FROM THE ORIGINAL GAME

•This implementation does not include all Yahtzee combinations or scoring features.

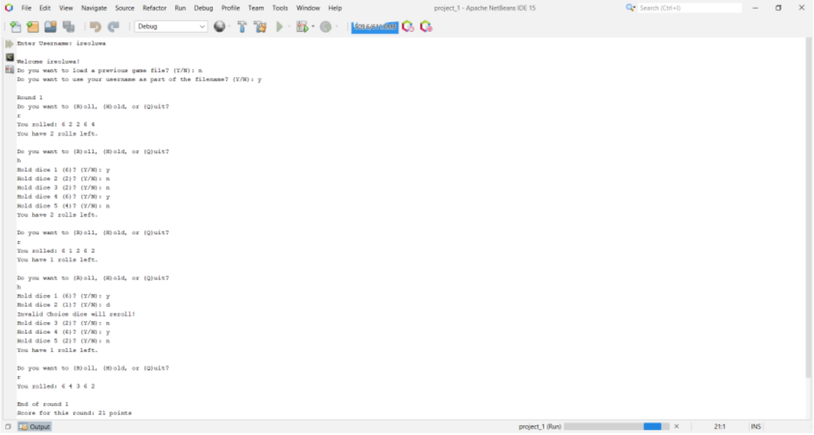
•The game does not support multiplayer.

THE LOGIC OF IT ALL

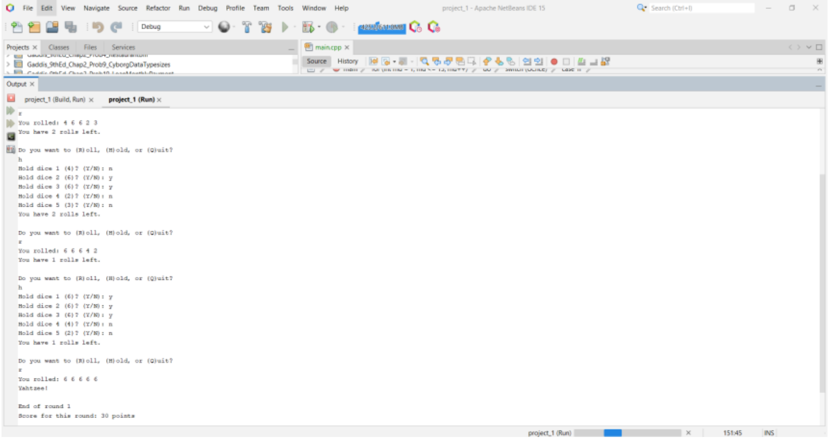
```
Declare Variables
Initialize Variables

Display welcome message and prompt for username

Ask if player wants to load a previous game file
IF player wants to load previous game
   Prompt for filename
   IF file opens successfully
      Display previous game results
      Display "Try to beat your previous score"
   ELSE
      Display "File not found. Starting a new game."
   END IF
END IF
```

```
Ask if player wants to use username as part of filename
Determine filename based on user input
Open file for writing game results

FOR each round (1 to 13)
   Reset dice hold status
   Output round information

   REPEAT
      Get user's choice (Roll, Hold, or Quit)

      SWITCH user's choice
         CASE Roll:
            Roll dice not on hold
            Display rolled dice values
            Write rolled dice values to file
            Check for Yahtzee
            Check for Large Straight
            Decrement number of rolls left

         CASE Hold:
            For each die
               Ask if player wants to hold the die
               Update hold status based on player's choice

         CASE Quit:
            Set round to 13 to end the game

         DEFAULT:
            Display "Invalid Choice!"
      END SWITCH

      Notify user of remaining rolls

   UNTIL out of rolls or player quits

   Calculate and display round score
   Write round results to file

   IF last round
      Calculate and display final score and average
      Write final results to file
   END IF
END FOR

Close the file
```

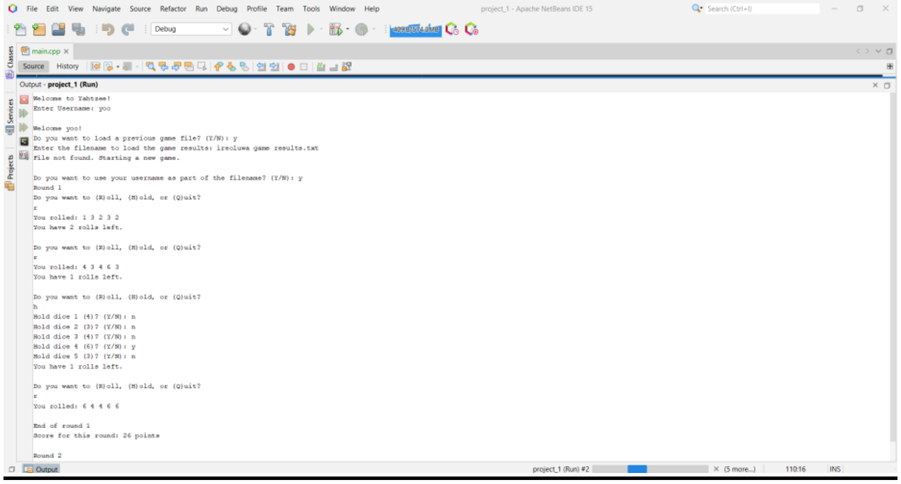
PROOF OF WORKING CODE


File Edit View Navigate Source Refactor Run Debug Profile Team Tools Window Help
project_1 - Apache NetBeans IDE 15
Search (Ctrl+I)
Debug
Output
project_1 (Run)
INS

```
Enter Username: ireoluwa

Welcome ireoluwa!
Do you want to load a previous game file? (Y/N): n
Do you want to use your username as part of the filename? (Y/N): y

Round 1
Do you want to (R)oll, (H)old, or (Q)uit?
r
You rolled: 6 2 2 6 4
You have 2 rolls left.

Do you want to (R)oll, (H)old, or (Q)uit?
h
Hold dice 1 (6)? (Y/N): y
Hold dice 2 (2)? (Y/N): n
Hold dice 3 (2)? (Y/N): n
Hold dice 4 (6)? (Y/N): y
Hold dice 5 (4)? (Y/N): n
You have 2 rolls left.

Do you want to (R)oll, (H)old, or (Q)uit?
r
You rolled: 6 1 2 6 2
You have 1 rolls left.

Do you want to (R)oll, (H)old, or (Q)uit?
h
Hold dice 1 (6)? (Y/N): y
Hold dice 2 (1)? (Y/N): d
Invalid Choice dice will reroll!
Hold dice 3 (2)? (Y/N): n
Hold dice 4 (6)? (Y/N): y
Hold dice 5 (2)? (Y/N): n
You have 1 rolls left.

Do you want to (R)oll, (H)old, or (Q)uit?
r
You rolled: 6 4 3 6 2

End of round 1
Score for this round: 21 points
```


File Edit View Navigate Source Refactor Run Debug Profile Team Tools Window Help
project_1 - Apache NetBeans IDE 15
Search (Ctrl+I)
Debug
Projects Classes Files Services
Gaddis_9thEd_Chap2_Prob9_CyborgDataTypesizes
main.cpp
Source History
Output
project_1 (Build, Run)
project_1 (Run)
INS

```
r
You rolled: 4 6 6 2 3
You have 2 rolls left.

Do you want to (R)oll, (H)old, or (Q)uit?
h
Hold dice 1 (4)? (Y/N): n
Hold dice 2 (6)? (Y/N): y
Hold dice 3 (6)? (Y/N): y
Hold dice 4 (2)? (Y/N): n
Hold dice 5 (3)? (Y/N): n
You have 2 rolls left.

Do you want to (R)oll, (H)old, or (Q)uit?
r
You rolled: 6 6 6 4 2
You have 1 rolls left.

Do you want to (R)oll, (H)old, or (Q)uit?
h
Hold dice 1 (6)? (Y/N): y
Hold dice 2 (6)? (Y/N): y
Hold dice 3 (6)? (Y/N): y
Hold dice 4 (4)? (Y/N): n
Hold dice 5 (2)? (Y/N): n
You have 1 rolls left.

Do you want to (R)oll, (H)old, or (Q)uit?
r
You rolled: 6 6 6 6 6
Yahtzee!

End of round 1
Score for this round: 30 points
```



```
Welcome to Yahtzee!
Enter Username: yoo

Welcome yoo!
Do you want to load a previous game file? (Y/N): y
Enter the filename to load the game results: ireoluwa game results.txt
File not found. Starting a new game.

Do you want to use your username as part of the filename? (Y/N): y
Round 1
Do you want to (R)oll, (H)old, or (Q)uit?
r
You rolled: 1 3 2 3 2
You have 2 rolls left.

Do you want to (R)oll, (H)old, or (Q)uit?
r
You rolled: 4 3 4 6 3
You have 1 rolls left.

Do you want to (R)oll, (H)old, or (Q)uit?
h
Hold dice 1 (4)? (Y/N): n
Hold dice 2 (3)? (Y/N): n
Hold dice 3 (4)? (Y/N): n
Hold dice 4 (6)? (Y/N): y
Hold dice 5 (3)? (Y/N): n
You have 1 rolls left.

Do you want to (R)oll, (H)old, or (Q)uit?
r
You rolled: 6 4 4 6 6

End of round 1
Score for this round: 26 points

Round 2
```

THE CODE

```
/*
 * Author: Ireoluwa
 * Created on July 21, 4:18 pm
 * Purpose: a game of Yahtzee
 */

// System Libraries
#include <iostream>   // I/O library for input and output operations
#include <ctime>      // Library to work with time functions
#include <cstdlib>    // Random number generation
#include <fstream>    // File input and output
#include <iomanip>    // I/O manipulator
#include <string>     // string library
#include <cmath>      // Math library
using namespace std;
//User Libraries

//Global Constants - Mathematical, Scientific, Conversions

//Higher Dimensions go here. No Variables

//Function Prototypes

//Execution Begins here
int main(int argc, char** argv) {
    // Setting the random number seed
    srand(static_cast<unsigned int>(time(0)));

    // Declaring Variables
    fstream in, out;    // File streams for input and output
    const int Md = 6, mnD = 1;         // Max and min value for a  dice
    char GChce, Chce, sChce, plymode, shwRuls, ldgFile;    // game Choices
    int d1, d2, d3, d4, d5, rllsLft, ttlScre, y;
    bool h1, h2, h3, h4, h5;      // Boolean to track dice status
    float ascore;
    string Yname, fname, line;

    // Initialize Variables
    out.open(fname, ios::out);
    in.open(fname, ios::in);
    ttlScre = 0;


    // Welcome message and prompt for username
    cout << "Welcome to Yahtzee!" << endl;
    cout << "Enter Username: ";
    getline (cin, Yname);
    cout << endl << "Welcome " << Yname <<"!" << endl;

    // Ask if the player wants to load a previous game file
    cout << "Do you want to load a previous game file? (Y/N): ";
    cin >> ldgFile;
```

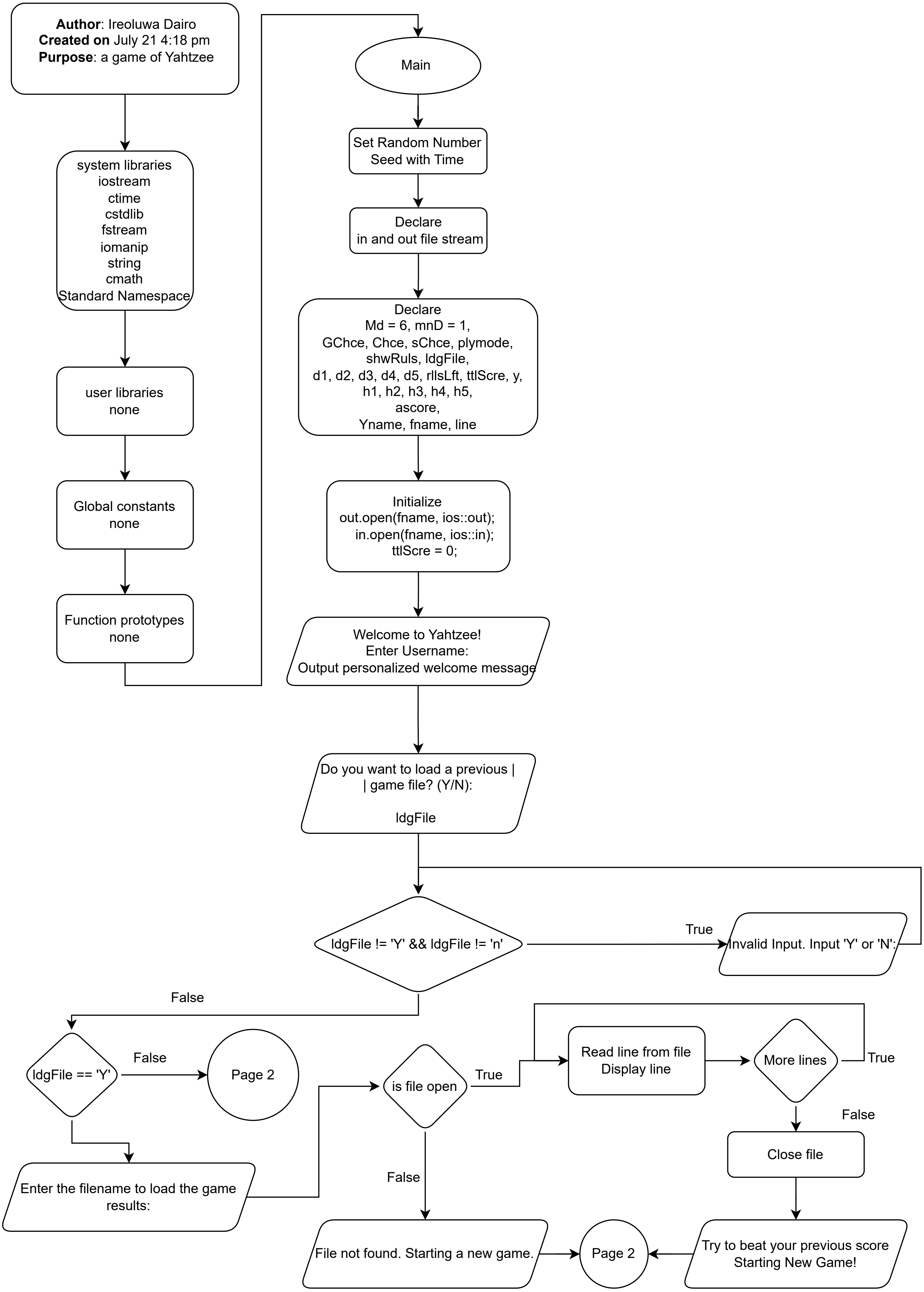
```
cin.ignore();
while(ldgFile != 'Y' && ldgFile != 'y' && ldgFile != 'N' && ldgFile != 'n'){
    cout << "Invalid Input. Input 'Y' or 'N': ";
    cin >> ldgFile;
    cin.ignore();
}

// Load game file if the user chooses to
if (ldgFile == 'Y' || ldgFile == 'y') {
    cout << "Enter the filename to load the game results: ";
    getline(cin, fname);
    in.open(fname, ios::in);
    if (in.is_open()) {
        while (getline(in, line)) {
            cout << line << endl << endl;
        }

            cout << "Try to beat your previous score" << endl;
            cout << "Starting New Game!" << endl << endl;
          in.close();
    } else {
        cout << "File not found. Starting a new game." << endl << endl;
    }
}

// Ask if the player wants to use their username as part of the filename
cout << "Do you want to use your username as part of the filename? (Y/N): ";
cin >> sChce;
cin.ignore();
while ( sChce != 'Y' && sChce != 'y' && sChce != 'n' &&
                        sChce != 'N'){
                    cout << "Invalid Input. Input 'Y' or 'N': ";
                     cin >> sChce;
                        cin.ignore();
                }

// Determine the filename based on user input
if (sChce == 'Y' || sChce == 'y') {
    fname = Yname + " game results.txt";
}
else {
    cout << "Enter the filename to save the game results:";
    getline (cin, fname);
}
// save file - Open file for writing game results
out.open(fname, ios::out);
if (out.is_open()) {
        out << "Welcome to Yahtzee!" << endl;
    }

// Game loop to manage multiple rounds
for (int rnd = 1; rnd <= 13; rnd++) {
    h1 = h2 = h3 = h4 = h5 = false; // Reset dice hold status
    rllsLft = 3;                    // Number of rolls in the current round
```

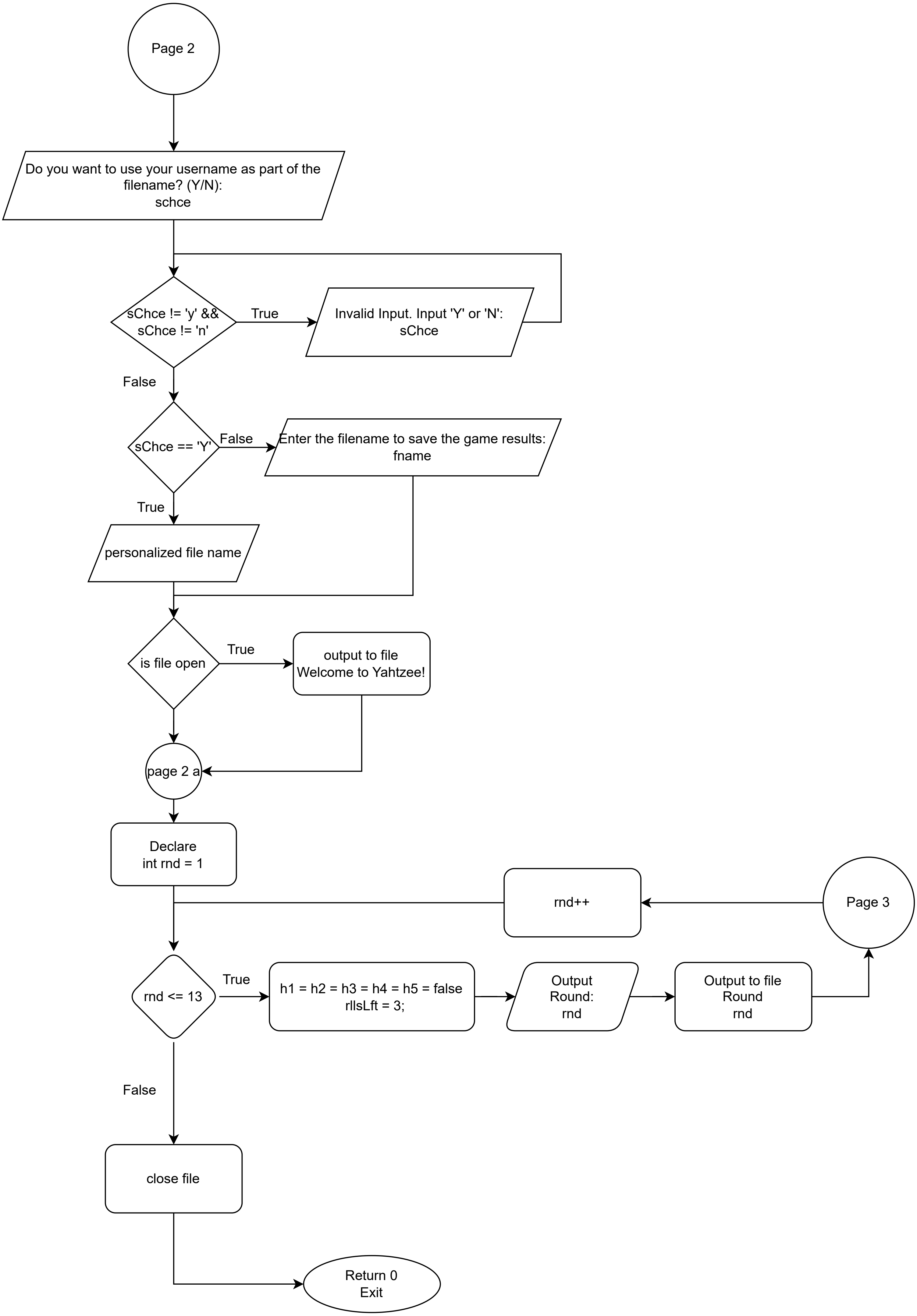
```
// Output round information
cout << "Round " << rnd << endl;
out << "Round " << rnd << endl;          // Write round  to file

// Get the user's Choice for the next action
do {
    cout << "Do you want to (R)oll, (H)old, or (Q)uit?" << endl;
    cin >> GChce;
    cin.ignore();

    switch (GChce) {   // Switch statement to handle the user's Choice
        case 'R':               // If the user chooses to roll the dice
        case 'r':
            if (!h1) d1 = rand() % Md + mnD;
            if (!h2) d2 = rand() % Md + mnD;
            if (!h3) d3 = rand() % Md + mnD;
            if (!h4) d4 = rand() % Md + mnD;
            if (!h5) d5 = rand() % Md + mnD;

            // Display rolled dice values
            cout << "You rolled: " << d1 << " " << d2 << " ";
            cout << d3 << " " << d4 << " " << d5 << endl;

            // Write rolled dice values to file
            out << "Rolled: " << d1 << " " << d2 << " ";
            out << d3 << " " << d4 << " " << d5 << endl;

            // Check for Yahtzee
            if (d1 == d2 && d2 == d3 && d3 == d4 && d4 == d5) {
                cout << "Yahtzee!" << endl;
                out << "Yahtzee!" << endl;
            }

            // Check for Large Straight
            else if ((d1==1 && d2==2 && d3==3 && d4 == 4 && d5 == 5) ||
                 (d1 == 2 && d2 == 3 && d3 == 4 &&d4 == 5 && d5 == 6)) {
                cout << "Large Straight!" << endl;
                out << "Large Straight!" << endl;
            }

            --rllsLft;            // Decrement the number of rolls left
            break;

        case 'H':           // If the user chooses to hold certain dice
        case 'h':

            // Ask the user if they want to hold a certain dice
            cout << "Hold dice 1 (" << d1 << ")? (Y/N): ";
            cin >> Chce;
            cin.ignore();
            if (Chce == 'Y' || Chce == 'y') {h1 = true;}
            else if (Chce == 'N' || Chce == 'n') {h1 = false;}
            else {cout << "Invalid Choice dice will reroll!" << endl;}
```

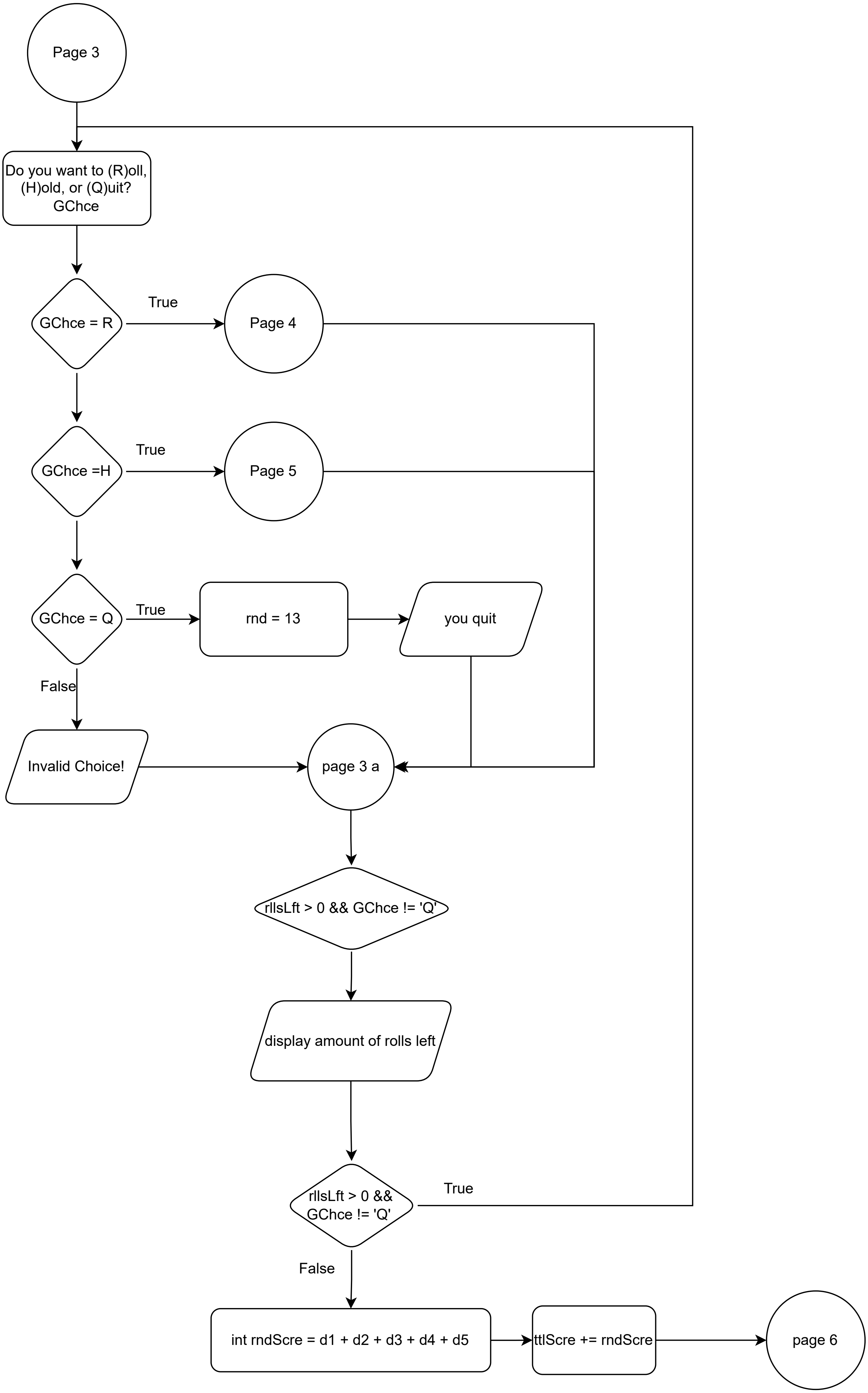
```
                cout << "Hold dice 2 (" << d2 << ")? (Y/N): ";
                cin >> Chce;
                cin.ignore();
                if (Chce == 'Y' || Chce == 'y') {h2 = true;}
                else if (Chce == 'N' || Chce == 'n') {h2 = false;}
                else {cout << "Invalid Choice dice will reroll!" << endl;}

                cout << "Hold dice 3 (" << d3 << ")? (Y/N): ";
                cin >> Chce;
                cin.ignore();
                if (Chce == 'Y' || Chce == 'y') {h3 = true;}
                else if (Chce == 'N' || Chce == 'n') {h3 = false;}
                else {cout << "Invalid Choice dice will reroll!" << endl;}

                cout << "Hold dice 4 (" << d4 << ")? (Y/N): ";
                cin >> Chce;
                cin.ignore();
                if (Chce == 'Y' || Chce == 'y') {h4 = true;}
                else if (Chce == 'N' || Chce == 'n') {h4 = false;}
                else {cout << "Invalid Choice dice will reroll!" << endl;}

                cout << "Hold dice 5 (" << d5 << ")? (Y/N): ";
                cin >> Chce;
                cin.ignore();
                while (Chce != 'Y' &&Chce !='y' &&Chce !='n' &&Chce != 'N'){
                    cout << "Invalid Input. Input 'Y' or 'N': ";
                    cin >> Chce; cin.ignore();
                }
                h5 = (Chce == 'Y' || Chce == 'y') ? true : false;
                break;

            case 'Q':               // If the user chooses to quit the game
            case 'q':
                cout << "You Quit!" << endl;
                rnd = 13;
                break;
            default:                // If the user enters an invalid Choice
                cout << "Invalid Choice!" << endl;
        }

        // Notify the user of remaining rolls
        if (rllsLft > 0 && GChce != 'Q' && GChce != 'q') {
            cout << "You have " << rllsLft << " rolls left." << endl<<endl;
        }

    } while (rllsLft > 0 && GChce != 'Q' && GChce != 'q');

    cout << endl;

//Displaying Input/Output Information
    int rndScre = d1 + d2 + d3 + d4 + d5;
    ttlScre += rndScre;
    cout <<"End of round "<<rnd<<endl;
```

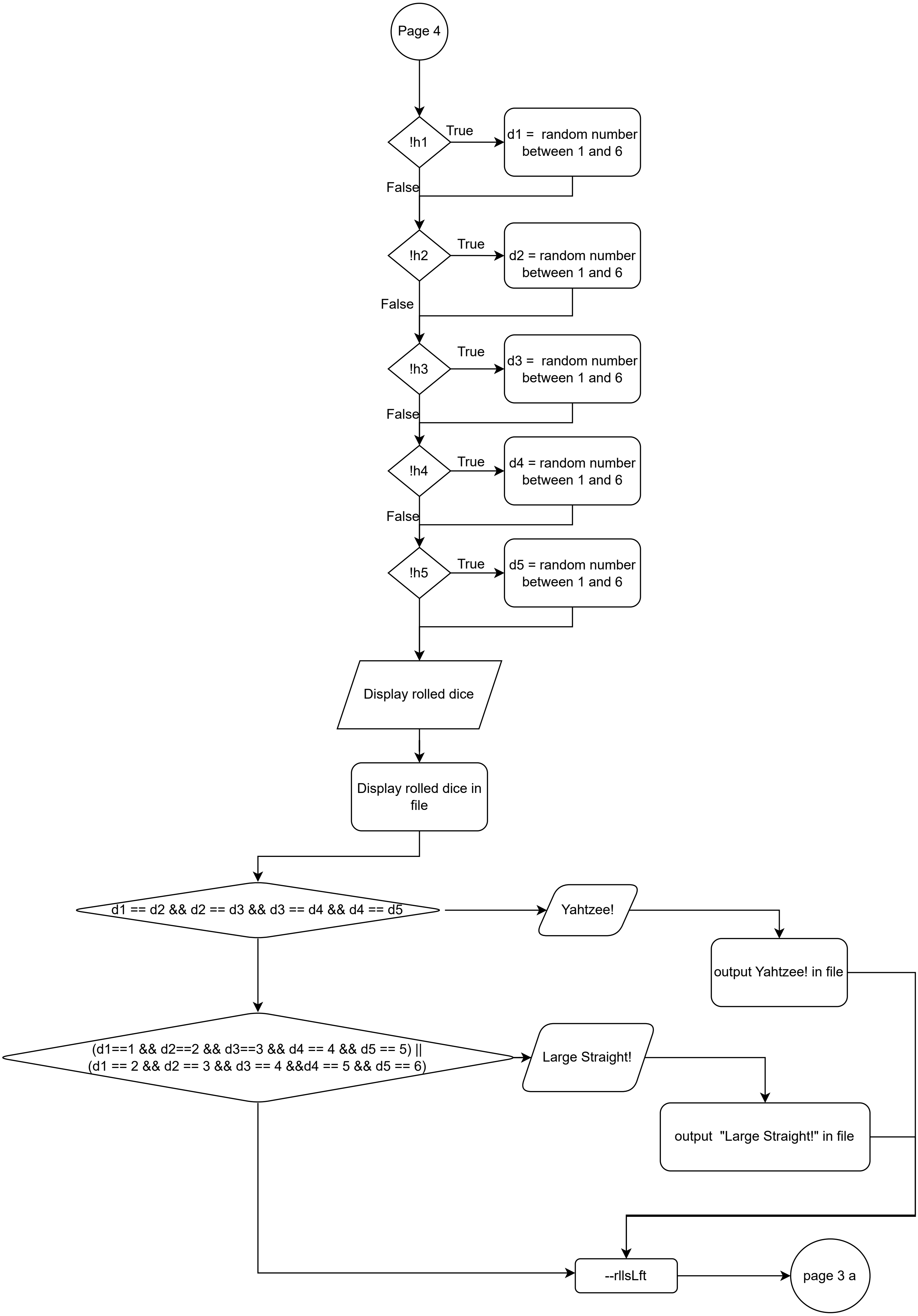
```
        cout <<"Score for this round: "<<rndScre<<" points"<<endl<<endl;

        // Write round results to file
        out <<"Score for this round: "<< rndScre << " points"<<endl << endl;

        if (rnd == 13){              // Display final score after the last round
            ascore = (ttlScre / 13.0f);
            y = round(ascore);
        cout<< "You finished with a score of " << setw(3) << setfill('0')<<
        ttlScre<<" points with an average of "<<y<<" point(s) per round"<<endl;

        // Write final results to file
        out << "You finished with a score of " << setw(3) << setfill('0')<<
        ttlScre<<" points with an average of "<<y<<" point(s) per round"<<endl;
        }
    }
    // Close the file
    out.close();

    //Exiting stage left/right
    return 0;
}
```

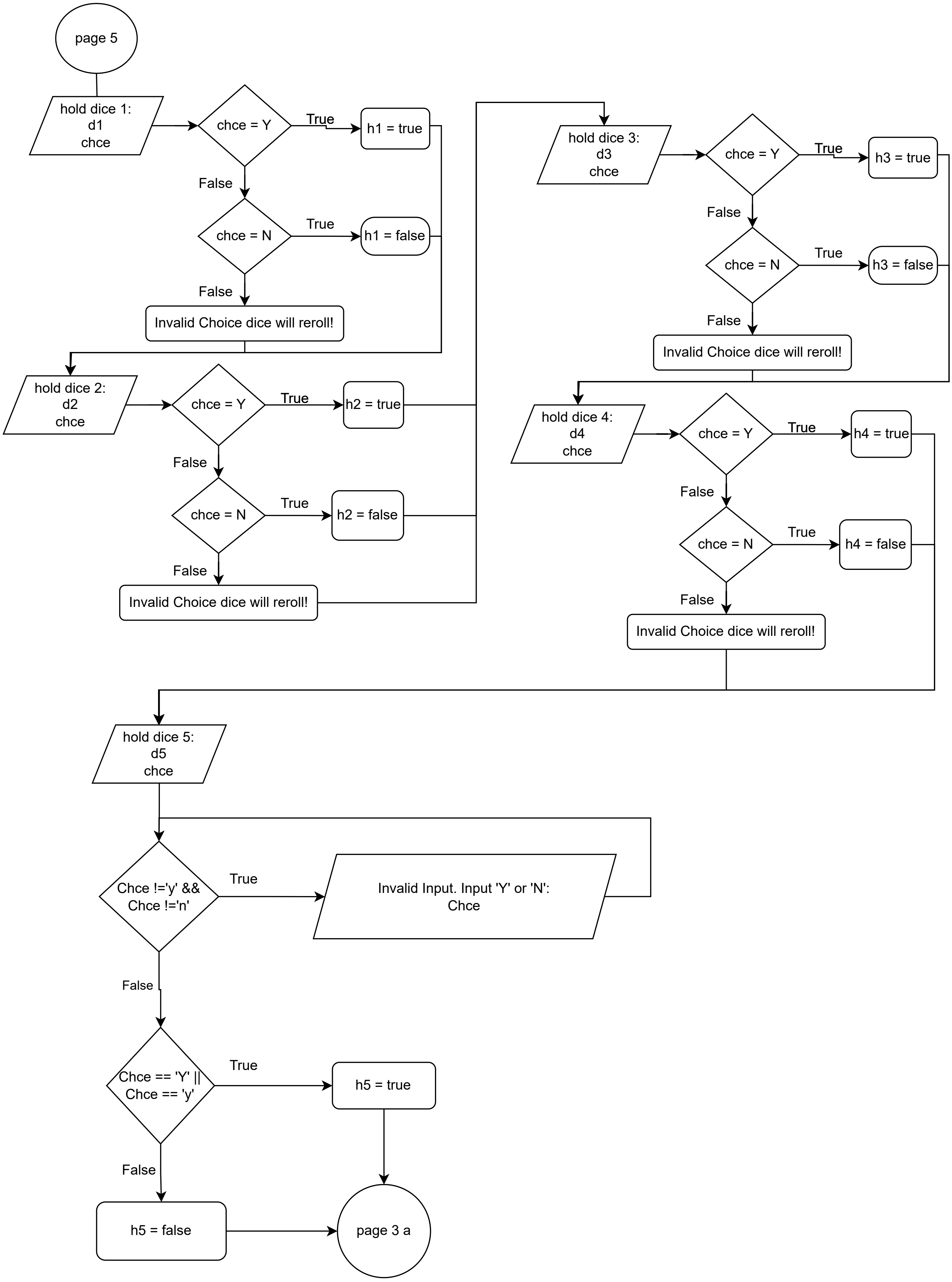
FLOWCHART

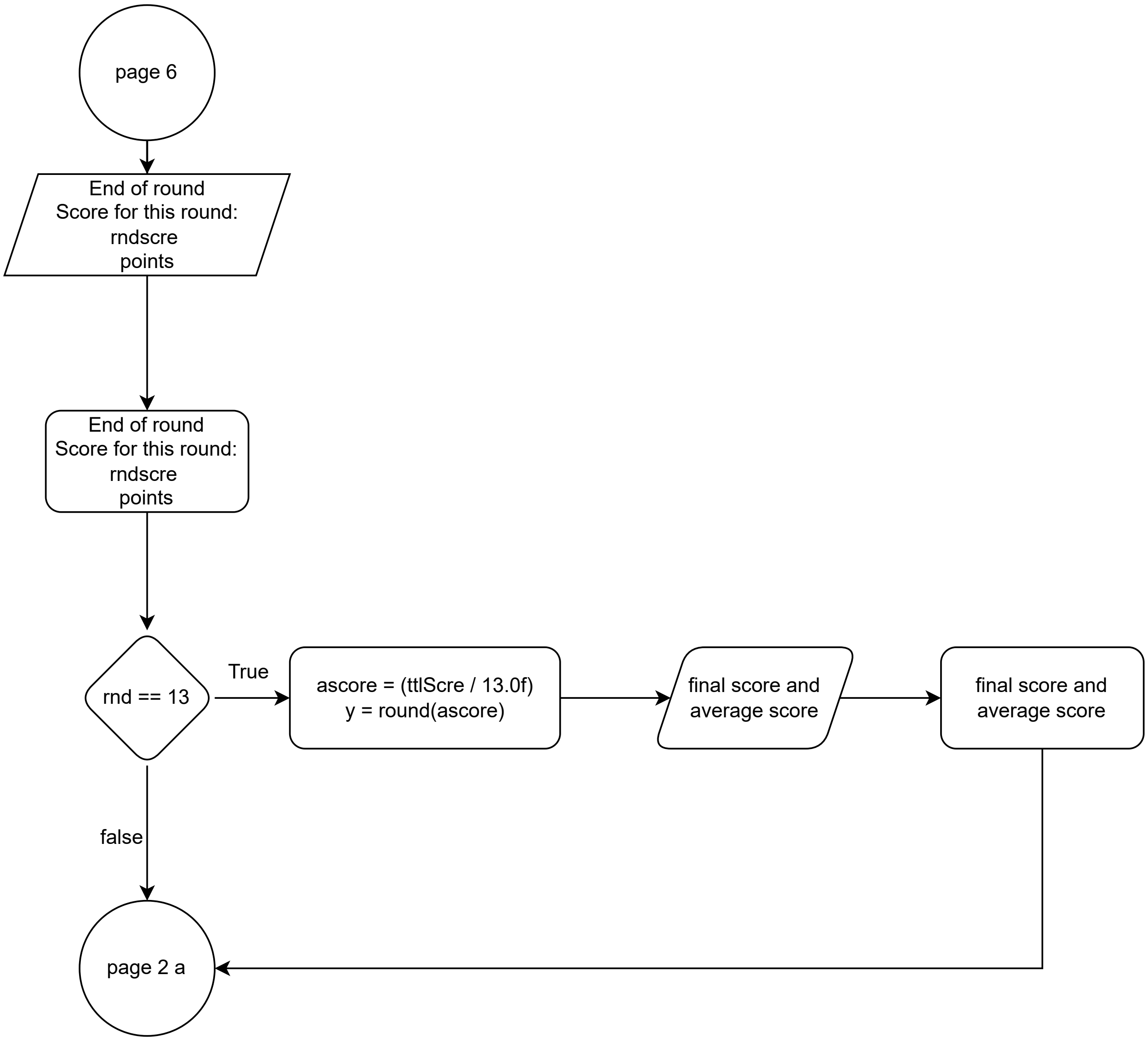

Author: Ireoluwa Dairo
Created on July 21 4:18 pm
Purpose: a game of Yahtzee
system libraries
iostream
ctime
cstdlib
fstream
iomanip
string
cmath
Standard Namespace
user libraries
none
Global constants
none
Function prototypes
none
Main
Set Random Number Seed with Time
Declare
in and out file stream
Declare
Md = 6, mnD = 1,
GChce, Chce, sChce, plymode,
shwRuls, ldgFile,
d1, d2, d3, d4, d5, rllsLft, ttlScre, y,
h1, h2, h3, h4, h5,
ascore,
Yname, fname, line
Initialize
out.open(fname, ios::out);
in.open(fname, ios::in);
ttlScre = 0;
Welcome to Yahtzee!
Enter Username:
Output personalized welcome message
Do you want to load a previous |
| game file? (Y/N):
ldgFile
ldgFile != 'Y' && ldgFile != 'n'
True
Invalid Input. Input 'Y' or 'N':
False
ldgFile == 'Y'
False
Page 2
Enter the filename to load the game results:
is file open
True
Read line from file
Display line
More lines
True
False
Close file
False
File not found. Starting a new game.
Page 2
Try to beat your previous score
Starting New Game!


Page 2
Do you want to use your username as part of the filename? (Y/N):
schce
sChce != 'y' &&
sChce != 'n'
True
Invalid Input. Input 'Y' or 'N':
sChce
False
sChce == 'Y'
False
Enter the filename to save the game results:
fname
True
personalized file name
is file open
True
output to file
Welcome to Yahtzee!
page 2 a
Declare
int rnd = 1
rnd++
Page 3
rnd <= 13
True
h1 = h2 = h3 = h4 = h5 = false
rllsLft = 3;
Output
Round:
rnd
Output to file
Round
rnd
False
close file
Return 0
Exit


Page 3
Do you want to (R)oll, (H)old, or (Q)uit? GChce
GChce = R
True
Page 4
GChce =H
True
Page 5
GChce = Q
True
rnd = 13
you quit
False
Invalid Choice!
page 3 a
rllsLft > 0 && GChce != 'Q'
display amount of rolls left
rllsLft > 0 && GChce != 'Q'
True
False
int rndScre = d1 + d2 + d3 + d4 + d5
ttlScre += rndScre
page 6


Page 4
!h1
True
d1 = random number between 1 and 6
False
!h2
True
d2 = random number between 1 and 6
False
!h3
True
d3 = random number between 1 and 6
False
!h4
True
d4 = random number between 1 and 6
False
!h5
True
d5 = random number between 1 and 6
Display rolled dice
Display rolled dice in file
d1 == d2 && d2 == d3 && d3 == d4 && d4 == d5
Yahtzee!
output Yahtzee! in file
(d1==1 && d2==2 && d3==3 && d4 == 4 && d5 == 5) ||
(d1 == 2 && d2 == 3 && d3 == 4 &&d4 == 5 && d5 == 6)
Large Straight!
output "Large Straight!" in file
--rllsLft
page 3 a


page 5
hold dice 1: d1 chce
chce = Y
True
h1 = true
False
chce = N
True
h1 = false
False
Invalid Choice dice will reroll!
hold dice 2: d2 chce
chce = Y
True
h2 = true
False
chce = N
True
h2 = false
False
Invalid Choice dice will reroll!
hold dice 3: d3 chce
chce = Y
True
h3 = true
False
chce = N
True
h3 = false
False
Invalid Choice dice will reroll!
hold dice 4: d4 chce
chce = Y
True
h4 = true
False
chce = N
True
h4 = false
False
Invalid Choice dice will reroll!
hold dice 5: d5 chce
Chce !='y' && Chce !='n'
True
Invalid Input. Input 'Y' or 'N': Chce
False
Chce == 'Y' || Chce == 'y'
True
h5 = true
False
h5 = false
page 3 a


page 6
End of round
Score for this round:
rndscre
points
End of round
Score for this round:
rndscre
points
rnd == 13
True
ascore = (ttlScre / 13.0f)
y = round(ascore)
final score and
average score
final score and
average score
false
page 2 a

Cross Reference from Project 1

You are to fill-in with where located in code

Chapter	Section	Topic	Where Line #"s	Pts	Notes
2	2	cout	Throughout		
	3	libraries	line 8 - 15	5	iostream, iomanip, cmath, cstdlib, fstream, string, ctime
	4	variables/literals	line 30 - 36		No variables in global area, failed project!
	5	Identifiers	Throughout		
	6	Integers	27,31 ,33, 104, 212	1	
	7	Characters	32	1	
	8	Strings	36	1	
	9	Floats No Doubles	35	1	Using doubles will fail the project, floats OK!
	10	Bools	34	1	
	11	Sizeof *****			
	12	Variables 7 characters or less	Throughout		All variables <= 7 characters
	13	Scope ***** No Global Variables			
	14	Arithmetic operators	Throughout		
	15	Comments 20%+	Throughout	2	Model as pseudo code
	16	Named Constants	31		All Local, only Conversions/Physics/Math in Global area
	17	Programming Style ***** Emulate			Emulate style in book/in class repositiory
3	1	cin	Throughout		
	2	Math Expression	Throughout		
	3	Mixing data types ****			
	4	Overflow/Underflow ****			
	5	Type Casting	27	1	
	6	Multiple assignment *****			
	7	Formatting output	223, 227	1	
	8	Strings	47	1	
	9	Math Library	14, 222	1	All libraries included have to be used
	10	Hand tracing ******			
4	1	Relational Operators			
	2	if	61, 99, 121-125	1	Independent if
	4	If-else	65, 90	1	
	5	Nesting	Throughout	1	
	6	If-else-if	158 ,165, 172,179,205	1	
	7	Flags *****			
	8	Logical operators	Throughout	1	
	11	Validating user input	54, 82 , 186	1	
	13	Conditional Operator	190	1	
	14	Switch	118	1	
5	1	Increment/Decrement	148	1	
	2	While	54, 66, 82 , 186	1	
	5	Do-while	113	1	
	6	For loop	104	1	
	11	Files input/output both	64, 98	2	
	12	No breaks in loops ******			Failed Project if included
****** Not required to show			Total	30	