Project 1
<Guessing Password>

CSC-17A
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Date: 11/04/17

Introduction

Title: Password Guessing Game

Assume three players are locked three bombs in their bodies. The passwords of these bombs are the same. This game is to get as many points as possible from guessing the password. The bomb with the lowest point will explode. If a player guesses the right password, the bomb will explode as well. The only way to survive is to get as many points as you can. However, if the three players have three same scores or their total score is equal to or greater than 17, they all survive. In round 1 and round 2, each player should check the file after he or she inputs guessing since there will be a hint and score for the player, and he or she should keep the hint as a secret.

Summary

Project size: 433 lines

Empty lines: 36 lines

The number of variables: 29

Function Prototypes: 7

Problems during coding

It took me about one and a half week to finish this project. Although I have experience doing project, I still had troubles while I was using new concepts to code.

First, I don’t want to make a game only for guessing the right password, but mainly to get points while players are guessing. I spent a few days to come up this idea.

Second, since players are guessing one by one in each round, it is impossible to output hints using “cout” object because I want them to keep the hint as a secret. I tried using functions and delete array methods to do it but it didn’t make sense. At last, I used output file, which is from chapter 12 to show hints and points to players.

System libraries

#include <cstdlib>
#include <iostream>
#include <ctime>
#include <fstream>
#include <string>
#include <cmath>
#include <cstring>
#include <cctype>
#include <iomanip>

Global Constants

const int	SIZE=4	Digits of number
const int	SIZE1=3	Number of players

Structures

```
struct PlaInfo{     //Player Information
        string name; //Player's name
         int score1;   //First player score
         int score2;   //Second player score
         int score3;   //Third player
};
struct Scores{   //Scores information
         int sco1;       //Total score for 1st player
         int sco2;       //Total score for 2nd player
         int sco3;       //Total score for 3rd player
         int total;      //Total score for all 3 players
};
```

```
struct Number{    //Number digits information
        int num;
        int digit1;     //Digit one
        int digit2;     //Digit two
        int digit3;     //Digit three
        int digit4;      //Digit four
        Scores score; //Nested structure Scores
};
```

Variables

PlaInfo	plaInfo [SIZE1]	Structure array
Number	num	structure
int	*Password *Password2	Two identical pointer

fstream	daFile	Date file
int	Score=0	Initialize score 0
int	number	Call getInput function
int	choice2	Round 2: choice
int	lowest	Answer for the lowest digit
char	answer	Multiple choice
int	Number	Random number
int	sum1=0 sum2=0 sum3=0 total=0	In round 1: First digit Second digit Third digit Fourth digit

String	Name	
int	score1	
int	score2	
int	score3	
int	sco1	
int	sco2	
int	sco3	
int	total	
int	num	
int	digit1	
int	digit2	
int	digit3	
int	digit4	
Scores	score	

Function Prototypes

void Introduce( );
int *getNum ( );
int getInput(Number);
void markSrt(int *);
void outputFile(int, int *);
bool rightPass(Number, int *);
bool linearSrch (Number, int *);

Concepts

concept	type	code	location
Pointer variable	Pointer *	int *Password;	60
Pointer Array relationship	[ ] --> *	*(a+i)=*(a+i)^*(a+j); *(a+j)=*(a+i)^*(a+j); *(a+i)=*(a+i)^*(a+j);	392 393 394
Pointer as function parameters	FunctionName (datatype *)	void markSrt(int *);	51
Dynamic array	iptr = new int[size];	int *ranNum= new int [SIZE];	369

Returning pointers	Return pointer	return ranNum;	379
Abstract data types	ADT	Number num;	59
Combining data into structure	struct *tag* { *variable declaration;* // ... more declarations // may follow... };	truct PlaInfo{ string name; int score1; int score2; int score3; };	24 25 26 27 28 29
Accessing Structure members	Name.variable	cin>>plaInfo[i].name;	72
Array of structures	Ex. BookInfo bookList[20]	PlaInfo plaInfo[SIZE1];	58
Nested structures	struct a{…} struct b{a…}	Struct Scores {…}; Struct Number { Scores score }	44
Structure as function argument	Ex. void showRect (Rectangle r)	int getInput(Number);	50

File operation	fstream	Fstream daFile	62
	ios::out	daFile.open ("Players.h",ios::out);	123

Flowchart

https://go.gliffy.com/go/publish/12344286

Pseudo-code:

System libraries

//Global Constants

//Structures

//Function Prototypes

Main

//Declare Variables

    Introduce the game

//Input information

    Input player's name

Get two identical password arrays

//Round 1 begins!

//Input information

    Input the number

//Calculation

    Get the 4th digit

    Get the 3rd digit

    Get the 2nd digit

    Get the 1st digit

//If statement begins

If player guess the password

    Program run finishes

    Game over

    Return 0

End if

//If statement

if match digits

    for loop

        if digit matches

            output file

        End if

    End for loop

```
End if
//Display Output
output grades in round 1

//Round 2 begins
//Input information
        input choice2
//Switch statement
        case 1: Enter number
                If matches
                        Score add 5
                End if
                Else
                        Score add 1
                End if
        Case 2: Multiple choice
                If correct
                        Score add 2
                End if
                Else
                        Score add 0
                End if
```

End switch

//Display output

Output file

Output grades in round 2

//Round 3 begins

//Display output

Output hints

//Input information

Input the password

//If statement

If player guess the password

    Program run finishes

    Game over

    Return 0

End if

//Display output

Output the grades in round 3

//Calculation

Get each score

Get the total score

//Display Output

Output the final score

Output who dies, who survives or all survive

Return 0

End run

Code:

```
/*
 * File:   main.cpp
 * Author: Bochi Lin
 * Created on October 29, 2017, 11:49 AM
 * Purpose: CSC-17A Project 1
 */


#include <iostream> //I/O
#include <string>   //String
#include <cstdlib>  //Random
```

```
#include <fstream>  //I/O file
#include <cmath>    //Pow
#include <ctime>    //Time
#include <cstring>  //Cstring
#include <cctype>   //Check upper case
#include <iomanip>  //Setw

using namespace std;
//Global Constants
const int SIZE=4;  //Digits of number
const int SIZE1=3; //Number of players

//Structures
struct PlaInfo{  //Player Information
   string name; //Player's name
   int score1;  //First player score
   int score2;  //Second player score
   int score3;  //Third player
};

struct Scores{   //Scores information
   int sco1;    //Total score for 1st player
   int sco2;    //Total score for 2nd player
   int sco3;    //Total score for 3rd player
   int total;   //Total score for all 3 players
};

struct Number{    //Number digits information
   int num;
   int digit1;   //Digit one
   int digit2;   //Digit two
   int digit3;   //Digit three
   int digit4;   //Digit four
   Scores score; //Nested structure Scores
};
```

```
//Function Prototypes
void Introduce();              //Introduce the game
int *getNum();                 //Get the random password
int getInput(Number);          //Get the input here
void markSrt(int *);           //Using Mark sort to sort the array
bool linearSrch(int *,Number); //Linear search
void outputFile(int,int *);    //Output file
bool rightPass(Number,int *);  //Check right password

int main(int argc, char** argv) {
   //Declare variables
   PlaInfo plaInfo[SIZE1]; //Structure array
   Number num;             //Structure
   int *Password;          //Password pointer
   int *Password2;         //Same as Password pointer
   fstream daFile;         //Data file
   int score=0;           //Initialize score

   //Introduce the game
   Introduce();

   //Input information
   for (int i=0;i<SIZE1;i++){
      cout << "Please enter the name of ";
      cout << "player " <<i+1<< ": ";
      cin>>plaInfo[i].name; //Input player's name
   }

   //Get two identical password arrays
   Password=getNum();
   Password2=getNum();

   //Rounds begins here!
   cout<<"\n**********************************"<<endl;
```

```
   cout<<"*           ROUND 1              *"<<endl;
   cout<<"**********************************"<<endl;

   //Input information
   for (int j=0;j<SIZE1;j++) {
      cout<<"Player "<<plaInfo[j].name<<", please enter your guess:
"<<endl;
      int number=getInput(num);
      num.digit4=number%10;       //Get the 4th digit
      num.digit3=(number/10)%10;  //Get the 3rd digit
      num.digit2=(number/100)%10; //Get the 2nd digit
      num.digit1=number/1000;     //Get the 1st digit

      if(rightPass(num,Password)){ //If player guess the password
         cout<<"RESULT: "<<endl;
         cout<<"You guess the right password."<<endl;
         cout<<"The bomb explodes."<<endl;
         cout<<"Game over."; //If the player guess the right password, run
finish
         return 0;
      }

      //Round 1 begins here
      if (linearSrch(Password,num)){ //Call a bool function here
         for (int i = 0; i < SIZE1; i++) {
            if (num.digit1 == Password[i]) {
               daFile.open("Players.h",ios::out); //Open file
               daFile<<"You get 1 point in this round."<<endl;
               daFile << num.digit1 << " is right, and it is at digit " << i +
1 << endl;
               daFile.close();//close file
            }
            if (num.digit2 == Password[i]) {
               daFile.open("Players.h",ios::out);
               daFile<<"You get 1 point in this round."<<endl;
```

```
                daFile << num.digit2 << " is right, and it is at digit " << i +
1 << endl;
                daFile.close();
            }
            if (num.digit3 == Password[i]) {
                daFile.open("Players.h",ios::out);
                daFile<<"You get 1 point in this round."<<endl;
                daFile << num.digit3 << " is right, and it is at digit " << i +
1 << endl;
                daFile.close();
            }
            if (num.digit4 == Password[i]) {
                daFile.open("Players.h",ios::out);
                daFile<<"You get 1 point in this round."<<endl;
                daFile << num.digit4 << " is right, and it is at digit " << i +
1 << endl;
                daFile.close();
            }
        }
        score+=1; //If it is right, add one point
    }           //Else, the score is still 0
    cout<<"Check file 'Players' to see your score!\n"<<endl; //Output
score to file
    if (j==0) {
        plaInfo[0].score1=score; //Add score for the first player
        if (score==0) outputFile(plaInfo[0].score1, Password); //If the
score is 0, call function
    }
    if (j==1) {
        plaInfo[0].score2 =score; //Add score for the second player
        if (score==0) outputFile(plaInfo[0].score2, Password); //If the
score is 0, call function
    }
    if (j==2) {
        plaInfo[0].score3=score; //Add score for the third player
```

```
            if (score==0) outputFile(plaInfo[0].score3, Password); //if the
score is 0, call function
        }
        score = 0; //Initialize score to 0 again
    }

    //Here are the grades for the first round
    //Display output
    cout<<"--------- GRADES -----------"<<endl;
    cout<< "round 1" << endl;
    cout<<"   "<<plaInfo[0].score1<<endl;
    cout<<"   "<<plaInfo[0].score2<<endl;
    cout<<"   "<<plaInfo[0].score3<<endl;
    cout<<"--------------------------"<<endl;
    cout<<endl;

    //Round 2 begins
    markSrt(Password); //Call a function for using Mark sort to sort
password array
    cout<<"**************************************"<<endl;
    cout<<"*           ROUND 2              *"<<endl;
    cout<<"**************************************"<<endl;
    cout << "Now. The password is in a new order from low to
high."<<endl;
    if(Password[0]!=0) cout<<"Please guess the lowest number.
"<<endl;
    else cout<<"Please guess the number in the second digit.      "<<endl;
//If the lowest is 0, guess the second digit
    cout<<"-----------------------------------------------------"<<endl;
    for (int j=0; j<SIZE1;j++) {
        //Display menu here
        int choice2;
        cout<<"Player "<<plaInfo[j].name<<endl;
        cout<<"Do you want to guess the number on your own or choose
an answer?"<<endl;
```

```
        cout<<"1.On your own(5 points if correct/1 point if wrong);
2.choose answer(2 points if correct)"<<endl;
        cout<<"Please enter your choice: ";
        cin>>choice2;   //players enter their choice

        switch(choice2){
           case 1:{
              int lowest; //Lowest or 2nd digit
              cout<<"==>You chose to guess this number on your
own."<<endl;
              cout<<"Answer: ";
              cin>>lowest;//Enter the number
              cout<<"Check file 'Players' to see your score!\n"<<endl;
//Output score to file

              if(Password[0]!=0){//if the first digit is not 0
                 if(lowest==Password[0]){
                    score+=5; //If the number is right, add 5 points
                 }
                 else score+=1;//if the number is not right, add 1 point
              }
              else{//If the first digit is 0
                 if(lowest==Password[1]){//The number player entered is
compare to the second digit
                    score+=5;//If the number is right, add 5 points
                 }
                 else score+=1;//if the number is not right, add 1 point
              }
              break;
           }

           case 2:{
              char answer;
              int Number;
```

```
            cout<<"==>You choose to guess this number with an multiple
choice."<<endl;
            Number=rand()%9; //Get a random number here
            cout<<"Is "<<Number<<" the number?"<<endl;
            cout<<"A.Yes; B.No"<<endl;
            cout<<"Answer: ";
            cin>>answer; //Player enter his/her choice
            cout<<"Check file 'Players' to see your score!\n"<<endl;
//Output score to file

            if(Password[0]!=0){
               if(Number==Password[0]&&answer=='A') score+=2;
//If the choice is correct
               else if(Number!=Password[0]&&answer=='B') score+=2;
//then a 2 points
               else score=0;//If the choice is not correct,score is 0
            }
            if(Password[0]==0){//The same idea as below, but is compare
to the second digit
               if(Number==Password[1]&&answer=='A') score+=2;
               else if(Number!=Password[1]&&answer=='B') score+=2;
               else score=0;
            }
            break;
         }
      }
      daFile.open("Players.h",ios::out);//Open file
      daFile<<"You get "<<score<<" points in this round."<<endl;
//Output file
      daFile.close();//close the file
      //Add scores to each arrays of each player
      if (j==0) plaInfo[1].score1=score;
      if (j==1) plaInfo[1].score2=score;
      if (j==2) plaInfo[1].score3=score;
      score=0; //Initialize score to 0 again
```

```
        cout<<endl;
    }
    //Display the grades here
    cout<<endl;
    cout<<"---------- GRADES ----------"<<endl;
    cout << "round 1    round 2" << endl;
    cout<<"
"<<plaInfo[0].score1<<setw(11)<<plaInfo[1].score1<<endl;
    cout<<"
"<<plaInfo[0].score2<<setw(11)<<plaInfo[1].score2<<endl;
    cout<<"
"<<plaInfo[0].score3<<setw(11)<<plaInfo[1].score3<<endl;
    cout<<"----------------------------"<<endl;
    cout<<endl;

    //Round 3 begins here
    cout<<"**********************************"<<endl;
    cout<<"*           ROUND 3              *"<<endl;
    cout<<"**********************************"<<endl;
    cout<<"Now. The password is back into the original order."<<endl;
//Use array Password2
    cout<<"Hint: The third digit of the password is
"<<Password2[2]<<endl;//Show hints to players

    for(int i=0;i<SIZE1;i++){
        cout<<"Player "<<plaInfo[i].name<<", please enter your
guess:"<<endl;
        int number=getInput(num);
        num.digit4=number%10;       //Get the 4th digit
        num.digit3=(number/10)%10;  //Get the 3rd digit
        num.digit2=(number/100)%10; //Get the 2nd digit
        num.digit1=number/1000;     //Get the 1st digit
        cout<<endl;
```

```
        if(rightPass(num,Password2)){ //If the player guess the right
password, run finish
            cout<<"RESULT: "<<endl;
            cout<<"*******************************"<<endl;
            cout<<"You guess the right password.*"<<endl;
            cout<<"The bomb explodes. All die!  *"<<endl;
            cout<<"Game over.                   *"<<endl;
            cout<<"*******************************"<<endl;
        }

        else{
            if(pow(num.digit2-Password2[1],2)<=9){//If the range is equal to
or less than 3
                score+=1;                   //Score add 1
                if(num.digit2==Password2[1]) //If the second digit is correct
                    score+=3;           //Score add 3
            }
            if(pow(num.digit4-Password2[3],2)<=9){//If the range is equal to
or less than 3
                score+=2;                   //Score add 2
            }

        }

        //Add scores to each array
        if (i==0) plaInfo[2].score1 = score;
        if (i==1) plaInfo[2].score2 = score;
        if (i==2) plaInfo[2].score3 = score;
        score=0;//Initialize score to 0
    }

    //Display all three grades
    cout<<endl;
    cout<<"------------ GRADES ------------"<<endl;
    cout<<" round 1    round 2   round3"<<endl;
```

```
    cout<<"
"<<plaInfo[0].score1<<setw(11)<<plaInfo[1].score1<<setw(11)<<plaIn
fo[2].score1<<endl;
    cout<<"
"<<plaInfo[0].score2<<setw(11)<<plaInfo[1].score2<<setw(11)<<plaIn
fo[2].score2<<endl;
    cout<<"
"<<plaInfo[0].score3<<setw(11)<<plaInfo[1].score3<<setw(11)<<plaIn
fo[2].score3<<endl;
    cout<<"-------------------------------"<<endl;
    cout<<endl;

    //Calculate the final score
    for(int x=0;x<SIZE1;x++){
        num.score.sco1+=plaInfo[x].score1;
        num.score.sco2+=plaInfo[x].score2;
        num.score.sco3+=plaInfo[x].score3;
    }
    num.score.total=num.score.sco1+num.score.sco2+num.score.sco3;

    int sum1=num.score.sco1;
    int sum2=num.score.sco2;
    int sum3=num.score.sco3;
    int total=num.score.total;

    cout<<"RESULT:"<<endl;
    cout<<plaInfo[0].name<<" has "<<sum1<<" points."<<endl;
    cout<<plaInfo[1].name<<" has "<<sum2<<" points."<<endl;
    cout<<plaInfo[2].name<<" has "<<sum3<<" points."<<endl;
    cout<<"The total point is "<<total<<endl;

    if((sum1==sum2&&sum2==sum3)||total>=17) {

cout<<"**********************************************"<<en
dl;
```

```
        cout<<"** You all saved, the bomb has been disposed **"<<endl;

cout<<"**********************************************"<<en
dl;
    }
    else{

cout<<"**********************************************"<
<endl;
        if(sum3<sum1&&sum3<sum2) cout<<"Player
"<<plaInfo[2].name<<" dies with the lowest score."<<endl;
        if(sum2<sum1&&sum2<sum3) cout<<"Player
"<<plaInfo[1].name<<" dies with the lowest score."<<endl;
        if(sum1<sum2&&sum1<sum3) cout<<"Player
"<<plaInfo[0].name<<" dies with the lowest score."<<endl;
        if(sum1==sum2){
            if(sum2>sum3) cout<<"Player "<<plaInfo[2].name<<" dies with
the lowest score."<<endl; //3rd lowest
            else cout<<"Player "<<plaInfo[2].name<<" survives with the
highest score."<<endl;     //3rd highest
        }
        if(sum1==sum3){
            if(sum3>sum2) cout<<"Player "<<plaInfo[1].name<<" dies with
the lowest score."<<endl; //2nd lowest
            else cout<<"Player "<<plaInfo[1].name<<" survives with the
highest score."<<endl;     //2nd highest
        }
        if(sum3==sum2){
            if(sum2>sum1) cout<<"Player "<<plaInfo[0].name<<" dies with
the lowest score."<<endl; //1st lowest
            else cout<<"Player "<<plaInfo[0].name<<" survives with the
highest score."<<endl;     //1st highest
        }
```

```
cout<<"**************************************************"<
<endl;
   }

   //Program ends
   return 0;
}

//****************************
// Function               *
// Prototypes             *
//****************************

//Introduce the whole game here
void Introduce(){

cout<<"**************************************************
**********\n";
   cout<<"**         Welcome to the Passwords Guessing Game
**\n";
   cout<<"**        This game is to find password for the bomb
**\n";
   cout<<"**       Assume you three players have bombs lock your
bodies    **\n";
   cout<<"**              The passwords are the same                **\n";
   cout<<"**    You should try your best to get points in three rounds
**\n";
   cout<<"**   If you get the right password, don't think you are lucky
**\n";
   cout<<"**            because the bomb will explode               **\n";
   cout<<"**     What you have to do is getting as many points as you
can  **\n";
   cout<<"**       The person with the lowest points will die
**\n";
```

```
   cout<<"**   Make sure to check file after you input in round 1 and 2
**\n";
   cout<<"**If the total point is >=17 or 3 scores are same you all
survived**\n";

cout<<"**********************************************************
**********\n\n";
}

//Get the random password here
int *getNum(){
   //Declare variables
   int *ranNum=new int [SIZE]; //Set a dynamic array
   //Set a random seed
   srand(static_cast<int> (time(0)));

   //Get a four-digit random password here
   for (int i = 0; i < SIZE; i++) {
      ranNum[i]=rand()%9;
   }

   //Return the array
   return ranNum;
}

int getInput(Number n){
   cin>>n.num;
   return n.num;
}

//Mark sort to sort password digits from low to high
void markSrt(int *a){
   for(int i=0;i<SIZE-1;i++){
      for(int j=i+1;j<SIZE;j++){
         if(*(a+i)>*(a+j)){
```

```
            *(a+i)=*(a+i)^*(a+j);
            *(a+j)=*(a+i)^*(a+j);
            *(a+i)=*(a+i)^*(a+j);
         }
      }
   }
}

//Linear search to find the right digit
bool linearSrch(int *a, Number n) {
   for (int i=0;i<SIZE;i++) {
      if (n.digit1==a[i]) return true;
      if (n.digit2==a[i]) return true;
      if (n.digit3==a[i]) return true;
      if (n.digit4==a[i]) return true;
   }
   return false;
}

//Output hints to file called "Players.h" for each player
void outputFile(int a, int *b) {
   fstream daFile;
   if (a==0){
      daFile.open("Players.h");
      daFile<<"You get 0 points in this round."<<endl;
      daFile<<"Here is a hint for you: "<<endl;
      daFile<<"The first digit of the password is "<<*b<<endl;
      daFile.close();
   }
}

//Determine whether the player enter the right password or not
bool rightPass(Number n,int *a){
   if(n.digit1==a[0]){
      if(n.digit2==a[1]){
```

```
            if(n.digit3==a[2]){
                if(n.digit4==a[3]) return true;
            }
        }
    }
    return false;
}
```