Project 2

<Spot a Tank>

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Dare: 02/2/15

INTRODUCTION:

Title: Spot a Tank

The game explains what it’s happening, in this case it output that the camp it’s under attack.

It gives you 15 opportunities or shots to spot as many tanks as you can.

The Game consist of targeting tanks outside your camp which is under attack. You will have to input the angle to where you want to shoot and also the power with which you want to hit the tank. The only information given about where the tank is located is the distance of where they are coming towards your camp.

The Number of targeted it tank would add up and after your 15 shots are use it would tell your score.

SUMMARY

SPOT A TANK is a game where you can show how much your brain can think and show some math skills. The math skills would be able to be proven when you enter the angle to where you want to shoot and the power you want the projectile to have for the trajectory.

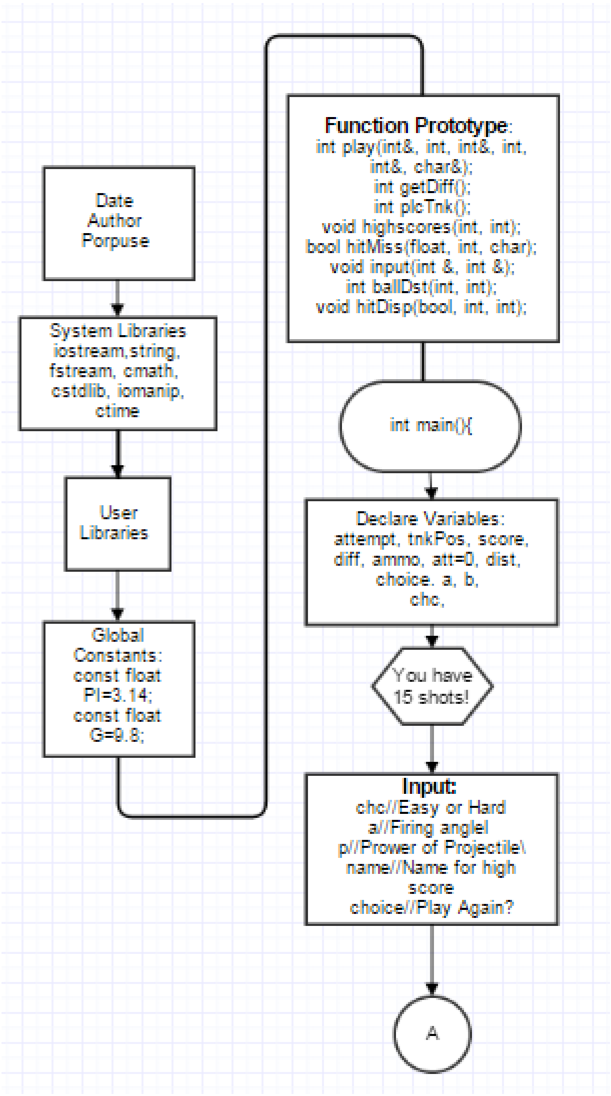
The game not only tell you that you missed but it also tell you that the shot was too far or close.

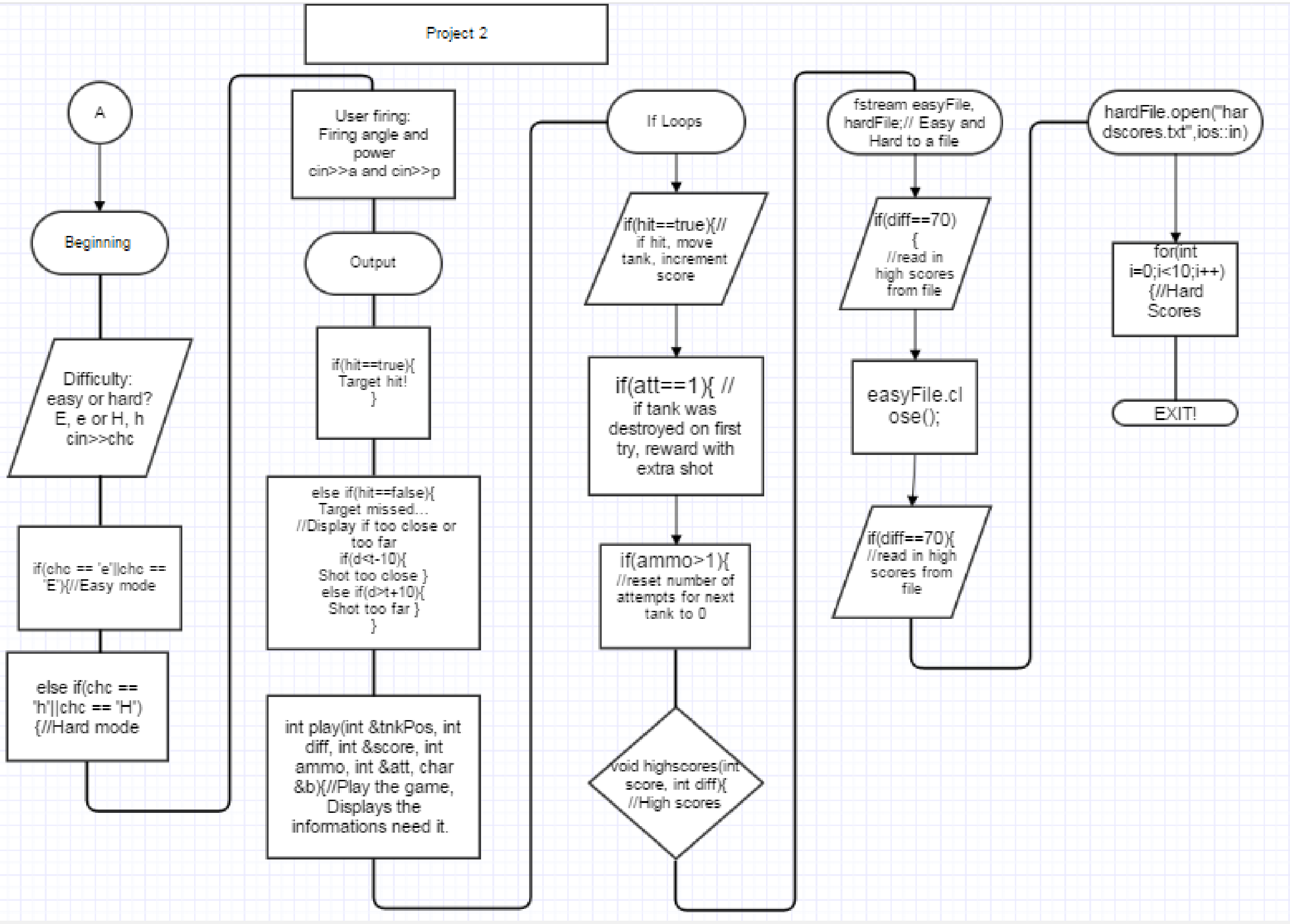
Description:

This project includes most of the concepts we have learn in class from the chapters we have covered. This project have strong possibilities to be extended for next project. The project can be improve by adding more levels using less space and different loops would also be a way to improve the game for next project.

It took me about 6-7 days or from 18-24 hours to make it, if more time could have been use to build it, it would have given better results. I tried to add as many knowledge as possible. The game it’s very simple but it can be improved to be better and wroth to play and have fun.

<Iostream>	✓
<ctime>	✓
<Iomanip>	✓
<cstdlib>	✓
<cmath>	✓
<fstream>	✓
<string>	✓
void	highscores(int, int); input(int &, int &);hitDisp(bool, int, int);
bool	hitMiss(float, int, char); bool hitMiss(float dist, int t, char diff)
int	✓
float	✓
char	✓
unsigned	✓
srand	✓ srand(seed);
for	✓
if	✓
while	✓
else if	✓
else	✓
do	✓
Easyfile. & hardfilr.	✓
play	(int&, int, int&, int, int&, char&);
string	name;
fstream	easyFile, hardFile;


Date
Author
Porpuse
System Libraries
iostream,string,
fstream, cmath,
cstdlib, iomanip,
ctime
User
Libraries
Global
Constants:
const float
PI=3.14;
const float
G=9.8;
Function Prototype:
int play(int&, int, int&, int,
int&, char&);
int getDiff();
int plcTnk();
void highscores(int, int);
bool hitMiss(float, int, char);
void input(int &, int &);
int ballDst(int, int);
void hitDisp(bool, int, int);
int main(){
Declare Variables:
attempt, tnkPos, score,
diff, ammo, att=0, dist,
choice. a, b,
chc,
You have
15 shots!
Input:
chc//Easy or Hard
a//Firing anglel
p//Prower of Projectile\
name//Name for high
score
choice//Play Again?
A


Project 2
A
Beginning
Difficulty: easy or hard? E, e or H, h cin>>chc
if(chc == 'e'||chc == 'E'){//Easy mode
else if(chc == 'h'||chc == 'H') {//Hard mode
User firing: Firing angle and power cin>>a and cin>>p
Output
if(hit==true){ Target hit! }
else if(hit==false){ Target missed... //Display if too close or too far if(d<t-10){ Shot too close } else if(d>t+10){ Shot too far } }
int play(int &tnkPos, int diff, int &score, int ammo, int &att, char &b){//Play the game, Displays the informations need it.
If Loops
if(hit==true){// if hit, move tank, increment score
if(att==1){ // if tank was destroyed on first try, reward with extra shot
if(ammo>1){ //reset number of attempts for next tank to 0
void highscores(int score, int diff){ //High scores
fstream easyFile, hardFile;// Easy and Hard to a file
if(diff==70) { //read in high scores from file
easyFile.close();
if(diff==70){ //read in high scores from file
hardFile.open("hardscores.txt",ios::in)
for(int i=0;i<10;i++) {//Hard Scores
EXIT!

No pseudocode,

```
//seed random number generator
   srand(seed);
do{ tnkPos = plcTnk(); //place tank
 //Prompt for difficulty   diff =  getDiff();
//Reset scores and ammo score = 0;
                               ammo = 15;
for (int attmpt = 0; attmpt<15; attmpt++){ //Loop for tank destruction
play (tnkPos, diff, score, ammo, att, b); ammo--; //call main game play function
if (b == 1){ //Bonus shot rewarding system increment shots remaining message decrement for loop
ammo++;
attempt--; }
}
while(choice=='y'||choice=='Y'); //Ask user for replay


int getDiff(){ //function for selecting difficulty
while(chc!='e'&&chc!='E' && chc!='h'&&chc!='H'){ //Input
//Initialize difficulty by setting explosive blast radius
if(chc == 'e'||chc == 'E'){  //Difficulty chosen EASY
else if(chc == 'h'||chc == 'H'){ // Difficulty chosen HARD
}


//Function to place tank
int plcTnk(){ //Place the Tank int
int x;
x = 1 + rand() % 999; // Random distance of tank placement
}
```

```
 //Function for user firing input
void input(int &a,int &p){ //Void the input
do{ cout<<"Input firing angle (0-90)"<<endl;
       cin>>a; } //Prompt the user for inputs
while(a>90||a<0); //The number have to be between 0 and 90
 do{ cout<<"Input projectile power in meters per second (1-100)"<<endl;
        cin>>p; }// Input projectile power in meters per second
}
//Function calculating where projectile hits
int ballDst(int a, int p){ //The trajectory of the projectile
float d;
d=((p*p)*sin(2*(a*(PI/180))))/G; //Projectile distance according to inputs(Angle and power
 return d; }

bool hitMiss(float dist, int t, char diff){ / /Function testing if projectile hit
if (dist > t-diff && dist < t+diff){ //test if projectiles blast radius hit tank
else //Projectile missed
void hitDisp(bool hit, int d, int t){ //Function for displaying hit information
if(hit==true){ // Target hit!
else if(hit==false){ // Target missed...
//Display if too close or too far
if(d<t-10){ // Shot too close
else if(d>t+10){ // Shot too far
int play(int &tnkPos, int diff, int &score, int ammo, int &att, char &b){//Projectile outputs
input (ang, power); //Prompt user for firing instructions
dist = ballDst(ang, power); //calculate projectile distance
hit = hitMiss(dist, tnkPos, diff);// your projectile hit
hitDisp(hit, dist, tnkPos); // //Display if hit or miss
if(hit==true){ //if hit, move tank, increment score
if(att==1){ // Hole in one bonus! Extra shot rewarded
if(ammo>1){ //reset number of attempts for next tank to 0
void highscores(int score, int diff){ // High score
string name; //Keep track of scores
fstream easyFile, hardFile;//Copy to a File
highscore scores[11];//11 high sores
if(diff==70){ // //High scores for easy
easyFile.open("easyscores.txt",ios::in); // //read in high scores from file
for(int i=0;i<10;i++){ //bring in values from file
easyFile>>scores[i].name;
easyFile>>scores[i].score; }
easyFile.close();//Close file
//test users new score
if(score>scores[9].score){ // New High Score
//set new score to 11th spot in array
scores[10].name = name;
scores[10].score = score;
for(int i = 10; i>0;i--){ //sort scores
if (scores[i].score > scores[i-1].score){ //set temp value
scores[11].score = scores[i].score;
scores[i].score = scores[i-1].score;
scores[i-1].score = scores[11].score;
//sort names
scores[11].name = scores[i].name;
      scores[i].name = scores[i-1].name;
         scores[i-1].name = scores[11].name;
easyFile.close();//Close file
easyFile.open("easyscores.txt", ios::out); //Open file for writing
easyFile.clear();//Clear file for writing
for(int i = 0; i<10;i++){ //write scores to file
easyFile.close();//close that file
```

```
for(int i=0; i<10;i++)//output high scores
else if(diff==30){ //high scores for hard
hardFile.open("hardscores.txt",ios::in); //read in high scores from file
for(int i=0;i<10;i++){//bring in values from file
 hardFile>>scores[i].name;
      hardFile>>scores[i].score;
if(score>scores[9].score){ //test users new score
//set new score to 11th spot in array
 scores[10].name = name;
      scores[10].score = score;
 for(int i = 10; i>0;i--){//sort scores
if (scores[i].score > scores[i-1].score){//set temp value
scores[11].score = scores[i].score;
       scores[i].score = scores[i-1].score;
               scores[i-1].score = scores[11].score;
//sort names
scores[11].name = scores[i].name;
       scores[i].name = scores[i-1].name;
             scores[i-1].name = scores[11].name;
hardFile.close();//Close file
hardFile.open("hardscores.txt", ios::out); //Open file for writing
hardFile.clear();//Clear file for writing
for(int i = 0; i<10;i++){ //write scores to file
hardFile.close(); //close that file

for(int i=0; i<10;i++){//output high scores
```

GAME CODE

```
//Libraries
#include <iostream>
#include <ctime>
#include <iomanip>
#include <cstdlib>
#include <cmath>
#include <fstream>
#include <string>
using namespace std;
//Global constants
const float PI = 3.14;
const float G = 9.8;
//Function prototypes
int  play(int&, int, int&, int, int&, char&);
int  getDiff();
int  plcTnk();
void highscores(int, int);
bool hitMiss(float, int, char);
void input(int &, int &);
int  ballDst(int, int);
void hitDisp(bool, int, int);
//initialize structure for high scores
struct highscore{
string name;
int score;
};
//Execution begins here
int main(){
//Declare variables
int attempt, tnkPos, score, diff, ammo, att=0;
float dist;
char choice, b;
char chc;
int x;
float d;
//Display title and story
cout<<" Fatal Trajectory "<<endl;
cout<<"You're under attack!!"<<endl;
```

```
cout<<"Outside your base, several tanks appear"<<endl;
cout<<"The tanks will come within 1000 meters."<<endl;
cout<<"Input the angle to aim your cannon and the speed to fire the
projectile."<<endl;
cout<<"You have 15 shots to destroy as many as you can."<<endl;
cout<<endl;
//Get the system time
unsigned seed = time(0);
//seed random number generator
srand(seed);
do{
tnkPos = plcTnk(); //place tank
//Prompt for difficulty
diff =  getDiff();
cout<<endl<<endl;
//Reset scores and ammo
score = 0;
ammo = 15;
//Loop for tank destruction
for (int attmpt = 0; attmpt<15; attmpt++){
//reset bonus to 0
 b=0;
//call main game play function
play (tnkPos, diff, score, ammo, att, b);
ammo--;
//Bonus shot rewarding system
//increment shots remaining message
//decrement for loop
if (b == 1){
    ammo++;
    attempt--;
    }
}
cout<<"score = "<<score<<endl;
cout<<"The number of tank you hit = "<<score/50<<endl;
//call function to show high scores
//Ask user for replay
cout<<"You want to Play again?"<<endl;
cout<<"Type Y to play again"<<endl;
cin>>choice;
}while(choice=='y'||choice=='Y');
return 0;
}
//function for selecting difficulty
int getDiff(){
char chc;
int diff;
//Prompt for difficulty
cout<<"How Difficult you want the game to be?"<<endl;
cout<<"Type 'e' for easy, type 'h' for hard"<<endl;
cin>>chc;
//Input
while(chc!='e'&&chc!='E' && chc!='h'&&chc!='H'){
cout<<"Invalid choice, type E or H"<<endl;
cin>>chc;
cout<<endl;
}
//Initialize difficulty by setting explosive blast radius
if(chc == 'e'||chc == 'E'){
cout<<"Easy mode activated!"<<endl;
cout<<"Cluster bombs enabled"<<endl;
cout<<"Blast radius: 70m"<<endl;
diff = 70;
}
else if(chc == 'h'||chc == 'H'){
cout<<"Hard mode!"<<endl;
cout<<"projectile blast radius: 30m"<<endl;
diff = 30;
}
return diff;
}
//Function to place tank
int plcTnk(){
int x;
x = 1 + rand() % 999;
```

```
return x;
}
//Function for user firing input
void input(int &a,int &p){
//Prompt the user for inputs
do{
cout<<"Input firing angle (0-90)"<<endl;
cin>>a;
}while(a>90||a<0);
do{
cout<<"Input projectile power in meters per second (1-100)"<<endl;
cin>>p;
}while(p>100||p<0);
}
//Function calculating where projectile hits
int ballDst(int a, int p){
float d;
d = ((p*p)*sin(2*(a*(PI/180))))/G;
return d;
}
//Function testing if projectile hit
bool hitMiss(float dist, int t, char diff){
//test if projectiles blast radius hit tank
if (dist > t-diff && dist < t+diff){
return true;
}
else
return false;
}
//Function for displaying hit information
void hitDisp(bool hit, int d, int t){
if(hit==true){
cout<<"Target hit!"<<endl;
cout<<"Tank was at "<<t<<"m"<<endl;
}
else if(hit==false){
cout<<"Target missed..."<<endl;
```

```
//Display if too close or too far
if(d<t-10){
    cout<<"Shot too close"<<endl;
}
else if(d>t+10){
    cout<<"Shot too far"<<endl;
}
}
cout<<endl<<endl;
}
int play(int &tnkPos, int diff, int &score, int ammo, int &att, char &b){
int ang, power;
float dist;
bool hit;
//show how many shots left
cout<<"Tank is approx. "<<tnkPos<<" meters away."<<endl;
cout<<"You have "<<ammo<<" shots left."<<endl;
//Prompt user for firing instructions
input (ang, power);
//calculate projectile distance
dist = ballDst(ang, power);
cout<<endl<<endl;
//test if hit or miss
hit = hitMiss(dist, tnkPos, diff);
cout<<"your projectile hit "<<dist<<" meters"<<endl<<endl;
//Display if hit or miss
hitDisp(hit, dist, tnkPos);
//increment bonus tester
att++;
//if hit, move tank, increment score
if(hit==true){
tnkPos = plcTnk();
score+=50;
//if tank was destroyed on first try, reward with extra shot
if(att==1){
    cout<<"Hole in one bonus!"<<endl;
    cout<<"Extra shot rewarded"<<endl<<endl;
    b = 1;
}
//reset number of attempts for next tank to 0
if(ammo>1){
cout<<"Another tank spotted!"<<endl<<endl;
}
att=0;
}
return score;
}
void highscores(int score, int diff){
string name;
fstream easyFile, hardFile;
highscore scores[11];
//High scores for easy
if(diff==70){
//read in high scores from file
 easyFile.open("easyscores.txt",ios::in);
 //bring in values from file
 for(int i=0;i<10;i++){
     easyFile>>scores[i].name;
     easyFile>>scores[i].score;
 }
//Close file
easyFile.close();
//test users new score
if(score>scores[9].score){
     cout<<"New High Score!"<<endl;
     cout<<"Input name:"<<endl;
     cin>>name;
     //set new score to 11th spot in array
     scores[10].name = name;
     scores[10].score = score;
     //sort scores
for(int i = 10; i>0;i--){
    if (scores[i].score > scores[i-1].score){
     //set scores value
     scores[11].score = scores[i].score;
     scores[i].score = scores[i-1].score;
     scores[i-1].score = scores[11].score;
     //sort names
     scores[11].name = scores[i].name;
     scores[i].name = scores[i-1].name;
     scores[i-1].name = scores[11].name;
     }
     }
 }
 //Close file
 easyFile.close();
 //Open file for writing
 easyFile.open("easyscores.txt", ios::out);
 //Clear file for writing
 easyFile.clear();
 //write scores to file
 for(int i = 0; i<10;i++){
     easyFile<<scores[i].name<<setw(15)<<scores[i].score<<endl;
 }
 //close that file
 easyFile.close();
 //output high scores
 cout<<"Easy High Scores!\n"<<endl;
 for(int i=0; i<10;i++){
 cout<<scores[i].name<<setw(10)<<scores[i].score<<endl;
 }
}
//high scores for hard
else if(diff==30){
    //read in high scores from file
    hardFile.open("hardscores.txt",ios::in);
    //bring in values from file
    for(int i=0;i<10;i++){
        hardFile>>scores[i].name;
        hardFile>>scores[i].score;
    }
```

```
//test users new score
if(score>scores[9].score){
    cout<<"New High Score!"<<endl;
    cout<<"Input name:"<<endl;
    cin>>name;
    //set new score to 11th spot in array
    scores[10].name = name;
    scores[10].score = score;
    //sort scores
for(int i = 10; i>0;i--){
  if (scores[i].score > scores[i-1].score){
    //set temp value
    scores[11].score = scores[i].score;
    scores[i].score = scores[i-1].score;
    scores[i-1].score = scores[11].score;
    //sort names
    scores[11].name = scores[i].name;
    scores[i].name = scores[i-1].name;
    scores[i-1].name = scores[11].name;
    }
    }
}
//Close file
hardFile.close();
//Open file for writing
hardFile.open("hardscores.txt", ios::out);
//Clear file for writing
hardFile.clear();
//write scores to file
for(int i = 0; i<10;i++){
    hardFile<<scores[i].name<<setw(15)<<scores[i].score<<endl;
}
//close that file
hardFile.close();
//output high scores
cout<<"Hard High Scores!"<<endl;
cout<<endl;
```

```
    for(int i=0; i<10;i++){
    cout<<scores[i].name<<setw(10)<<scores[i].score<<endl;
    }
}
}
```