Project 1

<Tic Tac Toe>
<Find the ball>

CIS-17A 42448
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Introduction

Title: Tic Tac Toe and Find the ball

This program has two games implemented to meet the requirement for the project.
The menu system can be navigated with the use of numbers.

For the first game “Find the ball from 5 cups” it shows the player 5 identical looking cups to guess which of the cups holds the ball. To pick the cups choose from 1~5 to pick the cups to which you would think the ball would be under. For example typing “1” will check if the first cup on the far left has to ball or not.

The second game is Tic Tac Toe which is a popular game that can be played anywhere. The person will choose an input from 1 to 9 and will fight a simple easy computer. The first one to get 3 rows of X’s will win the game.

Summary

Project size: about 400 lines
The number of variables: about 21 variables
The number of method: 13 functions.

The project includes all the concepts required for the project which we learned from the book and from the power point. It took getting use to using the structures with arrays inside of it. The most difficult part of coding this project is the de-allocation of memory from different types of arrays, such as array of structures and pointers in structures. I believe I have done the de-allocating correctly but I can’t seem to find any way of checking if any memory is leaking.

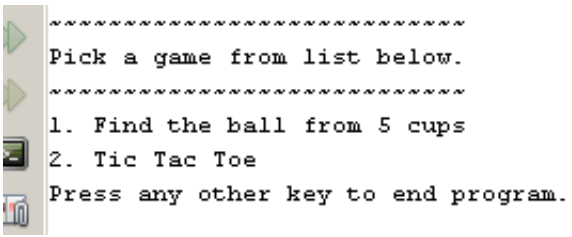
Building the game was not that difficult and the game was perfect for using a set of arrays in different types of ways.

Description

The creation of the game was to implement the concepts learned in class. The game utilizes structures with arrays to be used as a storage area to leave information and take information to functions to help process in an organized way.

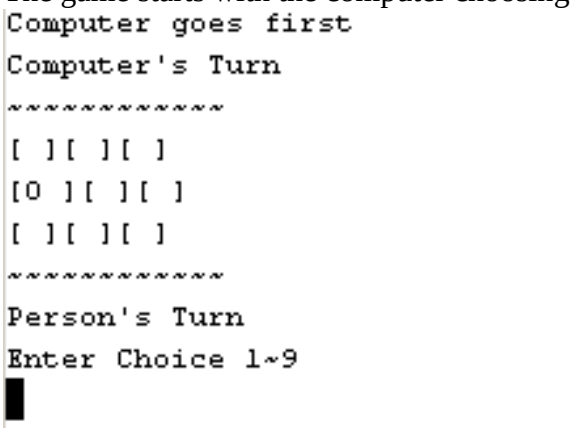
Input / Output

The entire program is navigated from a menu type system



For example to pick the game such as Tic Tac Toe from the figure above you would simply press the number 2 to head into that game from the menu.

The second game “Tic Tac Toe” is a popular game which is also used in a similar set of inputs. The game starts with the computer choosing first and asks you to enter a choice between 1 and 9.



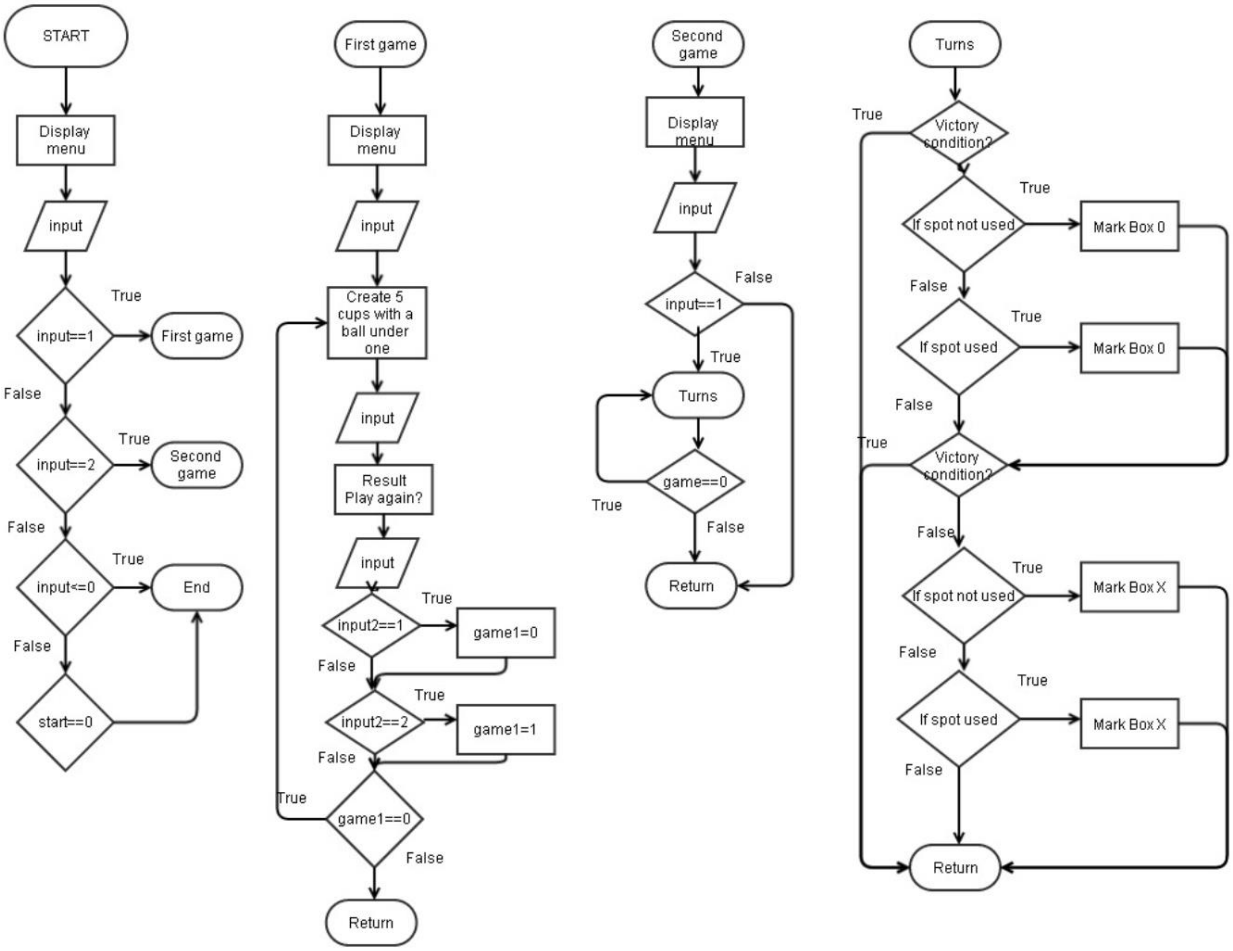
The number is coordinated such that
[1][2][3]
[4][5][6]
[7][8][9]. These choices are lined up in this order.
Simply play the game of Tic Tac Toe in which getting 3 “X’s” in a row will award you with a win.

PseudoCode

Initialize

Do While loop until game =0
Display Menu
If input equals 1 then go to first game
    Do while unti game is finished
    Create the cups
    Display the cups
    Put a ball into one of the cups randomly
    Asks to choose a cup to find the ball
    Input the answer
    Win or Lose
    Ask to play again
    Input
If input equals 2 then go to second game
    Do while game is over
    Create a tic tac toe display
    Randomly choose one of the arrays for computer
    Ask user to input in a box
    Input
    Win or Lose
    Ask if want to play again
    input
If input equals 3 then go exit

Flowchart


START
Display menu
input
input==1
True
First game
False
input==2
True
Second game
False
input<=0
True
End
False
start==0
First game
Display menu
input
Create 5 cups with a ball under one
input
Result Play again?
input
input2==1
True
game1=0
False
input2==2
True
game1=1
False
game1==0
True
False
Return
Second game
Display menu
input
input==1
False
True
Turns
game==0
True
False
Return
Turns
True
Victory condition?
If spot not used
True
Mark Box 0
False
If spot used
True
Mark Box 0
False
True
Victory condition?
False
If spot not used
True
Mark Box X
False
If spot used
True
Mark Box X
False
Return

Major Variables

Type	Variable Name	Description	Location
integer	input	used as input	main()
integer	start	used as an off switch	main()
integer	size	used as a memory number	game1()
integer	game1	off switch	game1()
integer	input1	as input	game1()
integer	input2	as input	game1()
integer	count	to count wins	game1()
integer	cup	array to fill	fillAry()
integer	random	random variable	random()
integer	choose	input used to choose a cup	result()
integer	SIZE	used to fill in array memory	game2()
integer	input	used to input	game2()
integer	game	leave game	game2()
integer	check	array to check if box filled	game2()
character	point	used to store in X or O	game2()
integer	input2	used as input	turns()
integer	a1	used as random variable	turns()
integer	a2	used as random variable	turns()
integer	count	used to count how many are filled	tie()

Concepts

Concept	Variable Name	Description	Location
Pointers with arrays	check	uses pointers in arrays within a structure	game2()
Arrays of structures	point	used to fill in X or O	game2()
Pointers with arrays	*	used all arrays as pointers	fillAry() game2()
Memory allocation	SIZE	used to dynamically allocate SIZE	In every array

Reference

1. Textbook
2. Power point
3. Past classwork code

Program

```
/*
 * File:   main.cpp
 * Author: Andrew Kim
 * Created on April 16, 2014, 3:24 PM
 * CSC-17A - Project 1
 */

//System Libraries
#include <iostream>
#include <cstdlib>
#include <ctime>
using namespace std;

//User defined libraries
#include "AryStruc.h"

//No Global Constants

//Structures
//Game 2
struct checkga{
   int *box;
};
//Function Prototypes
//Game 1
void game1(int &);
void fillAry(Array *,int);
void prntAry(Array *);
void dstry(Array *);
void effecta();
void effectb(Array *);
void random(Array *);
void result(Array *,int &);
//Game 2
void game2(int &);
void display(Array2 *);
void turns(checkga &,Array2 *,int &);
void win(Array2 *,int &);
void tie(Array2 *,int &);
//Execution Begins Here
int main(int argc, char** argv) {
   //Declare variables
   int input,start=0;
```

```
    //Continue the loop until player exits
    do{
        //Menu
        cout<<"~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~"<<endl;
        cout<<"Pick a game from list below."<<endl;
        cout<<"~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~"<<endl;
        cout<<"1. Find the ball from 5 cups"<<endl;
        cout<<"2. Tic Tac Toe"<<endl;
        cout<<"Press any other key to end program."<<endl;
        cout<<endl;
        cin>>input;
        if(input==1)game1(start);
        if(input==2)game2(start);
        if(input<=0||input>2)start=1;
    }while(start==0);
    return 0;
}

void tie(Array2 *a,int &game){
    int count =0;
    for(int i=0;i<9;i++){
        if(a[i].store==88||a[i].store==79){
            count++;
        }
    }
    if(count==9)game=1;
    cout<<"Tied"<<endl;
}

void win(Array2 *a,int &game){
    //Person
    //Straight Line Horizontal
    if(a[0].store==88&&a[1].store==88&&a[2].store==88){
        cout<<"You Win"<<endl;
        game=1;
    }
    if(a[3].store==88&&a[4].store==88&&a[5].store==88){
        cout<<"You Win"<<endl;
        game=1;
    }
    if(a[6].store==88&&a[7].store==88&&a[8].store==88){
        cout<<"You Win"<<endl;
        game=1;
    }
    //Straight Line Vertical
    if(a[0].store==88&&a[3].store==88&&a[6].store==88){
```

```
    cout<<"You Win"<<endl;
    game=1;
}
if(a[1].store==88&&a[4].store==88&&a[7].store==88){
    cout<<"You Win"<<endl;
    game=1;
}
if(a[2].store==88&&a[5].store==88&&a[8].store==88){
    cout<<"You Win"<<endl;
    game=1;
}
//Cross
if(a[0].store==88&&a[4].store==88&&a[8].store==88){
    cout<<"You Win"<<endl;
    game=1;
}
if(a[2].store==88&&a[4].store==88&&a[6].store==88){
    cout<<"You Win"<<endl;
    game=1;
}
//Computer
//Straight Line Horizontal
if(a[0].store==79&&a[1].store==79&&a[2].store==79){
    cout<<"You Lose"<<endl;
    game=1;
}
if(a[3].store==79&&a[4].store==79&&a[5].store==79){
    cout<<"You Lose"<<endl;
    game=1;
}
if(a[6].store==79&&a[7].store==79&&a[8].store==79){
    cout<<"You Lose"<<endl;
    game=1;
}
//Straight Line Vertical
if(a[0].store==79&&a[3].store==79&&a[6].store==79){
    cout<<"You Lose"<<endl;
    game=1;
}
if(a[1].store==79&&a[4].store==79&&a[7].store==79){
    cout<<"You Lose"<<endl;
    game=1;
}
if(a[2].store==79&&a[5].store==79&&a[8].store==79){
    cout<<"You Lose"<<endl;
    game=1;
```

```
    }
    //Cross
    if(a[0].store==79&&a[4].store==79&&a[8].store==79){
        cout<<"You Lose"<<endl;
        game=1;
    }
    if(a[2].store==79&&a[4].store==79&&a[6].store==79){
        cout<<"You Lose"<<endl;
        game=1;
    }
}

void display(Array2 *a){
    cout<<"~~~~~~~~~~~~"<<endl;
    cout<<"["<<a[0].store<<" ]["<<a[1].store<<" ]["<<a[2].store<<" ]"<<endl;
    cout<<"["<<a[3].store<<" ]["<<a[4].store<<" ]["<<a[5].store<<" ]"<<endl;
    cout<<"["<<a[6].store<<" ]["<<a[7].store<<" ]["<<a[8].store<<" ]"<<endl;
    cout<<"~~~~~~~~~~~~"<<endl;
}

void turns(checkga &chec,Array2 *b,int &game){
    //Declare variables
    int input2,a1,a2;
    if(game==0){
        //Computer
        cout<<"Computer's Turn"<<endl;
        a1=rand()%9+1;
        if(chec.box[a1-1]==0){
            b[a1-1].store=79;
            chec.box[a1-1]=1;
        }
        else if(chec.box[a1-1]==1){
            do{
                a2=rand()%9+1;
            }while(chec.box[a2-1]==1);
            b[a2-1].store=79;
            chec.box[a2-1]=1;
        }
        win(b,game);
        tie(b,game);
    }
    display(b);
    if(game==0){
        //Person
        cout<<"Person's Turn"<<endl;
        cout<<"Enter Choice 1~9"<<endl;
```

```
        cin>>input2;
        if(chec.box[input2-1]==0){
            b[input2-1].store=88;
            chec.box[input2-1]=1;
        }
        else if(chec.box[input2-1]==1){
            do{
                cout<<" Re-Enter Choice 1~9"<<endl;
                cin>>input2;
            }while(chec.box[input2-1]==1);
            b[input2-1].store=88;
            chec.box[input2-1]=1;
        }
        win(b,game);
        tie(b,game);
    }
}

void game2(int &start){
    //Set timer seed
    srand(static_cast<unsigned int>(time(0)));
    //Declare variables
    const int SIZE=9;
    int input,game=0;
    //Check if box is filled
    checkga check;
    check.box=new int [SIZE];
    //Array of structures to use to fill X or O
    Array2 *point=new Array2[SIZE];
    for(int i=0;i<SIZE;i++){
        check.box[i]=0;
    }
    for(int i=0;i<SIZE;i++){
        point[i].store=0;
    }
    cout<<"~~~~~~~~~~~~"<<endl;
    cout<<"Tic Tac Toe"<<endl;
    cout<<"~~~~~~~~~~~~"<<endl;
    cout<<"1. Start Game."<<endl;
    cout<<"2. Exit."<<endl;
    cin>>input;
    if(input==1){
        cout<<"Computer goes first"<<endl;
        do{
            turns(check,point,game);
        }while(game==0);
```

```
    };
    //Un-allocated
    delete []point;
    delete []check.box;

}

void result(Array *a,int &count){
    //Declare variable
    int choose;
    cout<<"Which cup has the ball?"<<endl;
    cout<<"Input the number between 1 to 5"<<endl;
    cout<<"1. First Cup"<<endl;
    cout<<"2. Second Cup"<<endl;
    cout<<"3. Third Cup"<<endl;
    cout<<"4. Forth Cup"<<endl;
    cout<<"5. Fifth Cup"<<endl;
    cin>>choose;

    cout<<"Your choice was "<<choose<<endl;
    if(choose==1){
        if(a->cup[0]==1){
            cout<<"You were right!"<<endl;
            count++;
        }
        else{
            cout<<"Wrong!"<<endl;
        }
    }
    if(choose==2){
        if(a->cup[1]==1){
            cout<<"You were right!"<<endl;
            count++;
        }
        else{
            cout<<"Wrong!"<<endl;
        }
    }
    if(choose==3){
        if(a->cup[2]==1){
            cout<<"You were right!"<<endl;
            count++;
        }
        else{
            cout<<"Wrong!"<<endl;
        }
```

```
    }
    if(choose==4){
        if(a->cup[3]==1){
            cout<<"You were right!"<<endl;
            count++;
        }
        else{
            cout<<"Wrong!"<<endl;
        }
    }
    if(choose==5){
        if(a->cup[4]==1){
            cout<<"You were right!"<<endl;
            count++;
        }
        else{
            cout<<"Wrong!"<<endl;
        }
    }
}

void random(Array *a){
    //Set timer seed
    srand(static_cast<unsigned int>(time(0)));
    //Declare variables
    int random;
    random=rand()%5+1;
    if(random==1)a->cup[0]=1;
    if(random==2)a->cup[1]=1;
    if(random==3)a->cup[2]=1;
    if(random==4)a->cup[3]=1;
    if(random==5)a->cup[4]=1;
}

void effectb(Array *a){
    if(a->cup[0]==1){
    cout<<"  .-~~-."<<"    .-~~-."<<"    .-~~-."<<"    .-~~-."<<"    .-~~-."<<endl;
    cout<<",|`-__-'|"<<" ,|`-__-'|"<<" ,|`-__-'|"<<" ,|`-__-'|"<<" ,|`-__-'|"<<endl;
    cout<<"|| BALL |"<<" ||  ?   |"<<" ||  ?   |"<<" ||  ?   |"<<" ||  ?   |"<<endl;;
    cout<<"`|      |"<<" `|      |"<<" `|      |"<<" `|      |"<<" `|      |"<<endl;
    cout<<"  `-__-'"<<"    `-__-'"<<"    `-__-'"<<"    `-__-'"<<"    `-__-'"<<endl;
    }
    if(a->cup[1]==1){
    cout<<"  .-~~-."<<"    .-~~-."<<"    .-~~-."<<"    .-~~-."<<"    .-~~-."<<endl;
    cout<<",|`-__-'|"<<" ,|`-__-'|"<<" ,|`-__-'|"<<" ,|`-__-'|"<<" ,|`-__-'|"<<endl;
    cout<<"||  ?   |"<<" || BALL |"<<" ||  ?   |"<<" ||  ?   |"<<" ||  ?   |"<<endl;;
```

```
    cout<<"`|     |"<<" `|     |"<<" `|     |"<<" `|     |"<<" `|     |"<<endl;
    cout<<"  `-__-'"<<"   `-__-'"<<"   `-__-'"<<"   `-__-'"<<"   `-__-'"<<endl;
    }
    if(a->cup[2]==1){
    cout<<"  .-~~-."<<"   .-~~-."<<"   .-~~-."<<"   .-~~-."<<"   .-~~-."<<endl;
    cout<<",|`-__-'|"<<" ,|`-__-'|"<<" ,|`-__-'|"<<" ,|`-__-'|"<<" ,|`-__-'|"<<endl;
    cout<<"||  ?   |"<<" ||  ?   |"<<" || BALL |"<<" ||  ?   |"<<" ||  ?   |"<<endl;;
    cout<<"`|     |"<<" `|     |"<<" `|     |"<<" `|     |"<<" `|     |"<<endl;
    cout<<"  `-__-'"<<"   `-__-'"<<"   `-__-'"<<"   `-__-'"<<"   `-__-'"<<endl;
    }
    if(a->cup[3]==1){
    cout<<"  .-~~-."<<"   .-~~-."<<"   .-~~-."<<"   .-~~-."<<"   .-~~-."<<endl;
    cout<<",|`-__-'|"<<" ,|`-__-'|"<<" ,|`-__-'|"<<" ,|`-__-'|"<<" ,|`-__-'|"<<endl;
    cout<<"||  ?   |"<<" ||  ?   |"<<" ||  ?   |"<<" || BALL |"<<" ||  ?   |"<<endl;;
    cout<<"`|     |"<<" `|     |"<<" `|     |"<<" `|     |"<<" `|     |"<<endl;
    cout<<"  `-__-'"<<"   `-__-'"<<"   `-__-'"<<"   `-__-'"<<"   `-__-'"<<endl;
    }
    if(a->cup[4]==1){
    cout<<"  .-~~-."<<"   .-~~-."<<"   .-~~-."<<"   .-~~-."<<"   .-~~-."<<endl;
    cout<<",|`-__-'|"<<" ,|`-__-'|"<<" ,|`-__-'|"<<" ,|`-__-'|"<<" ,|`-__-'|"<<endl;
    cout<<"||  ?   |"<<" ||  ?   |"<<" ||  ?   |"<<" ||  ?   |"<<" || BALL |"<<endl;;
    cout<<"`|     |"<<" `|     |"<<" `|     |"<<" `|     |"<<" `|     |"<<endl;
    cout<<"  `-__-'"<<"   `-__-'"<<"   `-__-'"<<"   `-__-'"<<"   `-__-'"<<endl;
    }
}

void effecta(){
    //Cup with effects
    cout<<"  .-~~-."<<"   .-~~-."<<"   .-~~-."<<"   .-~~-."<<"   .-~~-."<<endl;
    cout<<",|`-__-'|"<<" ,|`-__-'|"<<" ,|`-__-'|"<<" ,|`-__-'|"<<" ,|`-__-'|"<<endl;
    cout<<"||  ?   |"<<" ||  ?   |"<<" ||  ?   |"<<" ||  ?   |"<<" ||  ?   |"<<endl;;
    cout<<"`|     |"<<" `|     |"<<" `|     |"<<" `|     |"<<" `|     |"<<endl;
    cout<<"  `-__-'"<<"   `-__-'"<<"   `-__-'"<<"   `-__-'"<<"   `-__-'"<<endl;
}

void dstry(Array *a){
    delete []a->cup;
}

void prntAry(Array *a){
    //Print the cup and its contents
    for(int i=0;i<a->size;i++){
        cout<<a->cup[i]<<" ";
    }
    cout<<endl;
}
```

```
void fillAry(Array *a,int n){
    //Declare size in array structure
    a->size=n;
    //Allocate memory
    a->cup=new int [a->size];
    //Fill the array with 0's
    for(int i=0;i<a->size;i++){
        a->cup[i]=0;
    }
}

void game1(int &start){
    //Declare variables
    int size=5,game1=0,input1,input2,count=0;
    //Display Game 1 Menu
    cout<<"~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~"<<endl;
    cout<<"Try to find which cup holds the ball"<<endl;
    cout<<"~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~"<<endl;
    cout<<"1. Start Game."<<endl;
    cout<<"2. Exit."<<endl;
    cin>>input1;
    if(input1==1){
        do{
            Array cup;
            //Fill the cup
            fillAry(&cup,size);
            //Display the cups
            effecta();
            //Put a ball in one of the cups
            random(&cup);
            //prntAry(&cup);//To check
            result(&cup,count);
            effectb(&cup);
            //De-allocate
            dstry(&cup);
            //Give options to keep playing
            cout<<"~Current Record~"<<endl;
            cout<<"You currently have "<<count<<" wins."<<endl;
            cout<<endl;
            cout<<"Do you want to try again?"<<endl;
            cout<<"1. Yes."<<endl;
            cout<<"2. Exit."<<endl;
            cin>>input2;
            if(input2==1)game1=0;
            if(input2==2)game1=1;
```

```
        }while(game1==0);
    };
}
```