Introduction

Welcome to your favorite day of the week, programming day . This week, we shall work together to learn and implement new programming concepts.
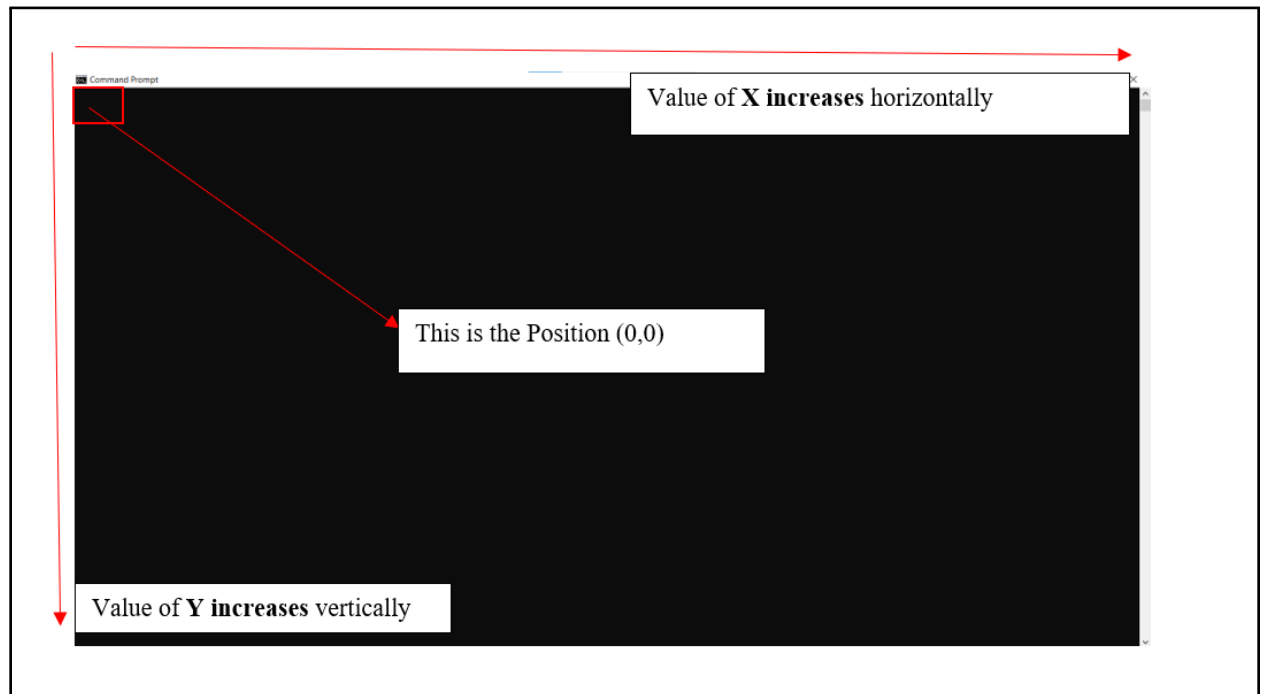
Skills to be Tested:

- Learning to use the gotoXY function

Let's do some coding.

gotoxy() Function

This function is used to take the cursor from the start of the screen to the given "XY" location. The value of X refers to the **Horizontal Position on the screen** and Y refers to the **Vertical Position of the cursor on the screen**.

Consider the following code snippet to understand the gotoxy() function.

Task 01(WP): Write a program that prints the test initially and then moves the cursor position to the given XY location on the screen.

```cpp
#include<iostream>
#include<windows.h>
using namespace std;

void gotoxy(int x, int y)
{
 COORD coordinates;
 coordinates.X = x;
 coordinates.Y = y;
 SetConsoleCursorPosition(GetStdHandle(STD_OUTPUT_HANDLE), coordinates);
}

int main()
{
cout<< "Test";

gotoxy(15,15);
cout<< "My name is Muhammad Irzam";

return 0;
}
```

You need to include this header file in order to use the function.

Just include this Function Definition into your code to use this function.

Pass the values for parameter (X,Y). X is horizontal position and Y is Vertical position.

```
D:\PF codes>c++ gotoxy.cpp -o test.exe

D:\PF codes>test.exe
Test

                          My name is Muhammad Irzam

D:\PF codes>
```

Initially, this is the position of the cursor.

After changing the values, the cursor has moved to this point.

The cursor will move to the position given through the gotoxy() parameter values.

```cpp
#include<iostream>
#include<windows.h>
using namespace std;

void gotoxy(int x, int y)
{
 COORD coordinates;
 coordinates.X = x;
 coordinates.Y = y;
 SetConsoleCursorPosition(GetStdHandle(STD_OUTPUT_HANDLE), coordinates);
}

int main()
{
system("cls");
cout<< "Test";

gotoxy(15,15);
cout<< "My name is Muhammad Irzam";

return 0;
}
```

You can use this to clear the console screen during the execution of the program.

```
Test




                    My name is Muhammad Irzam
D:\PF codes>
```

We already know the cls command, now if we want to use it during the execution of the program then we can just pass the command inside the **system("").**
Note: The **system()** is a function that requires a parameter that is passed as **cls**.
You can use the **system("cls")** to clear the screen during the execution of the program.

Let's code it out!

Task 02(CL): Print a maze on the screen after clearing everything else on the console.

```
C:\Windows\System32\cmd.exe
#########################
#                       #
#                       #
#                       #
#                       #
#                       #
#                       #
#                       #
#########################

D:\PF codes>
```

We have used the windows' function **cls** inside our c++ program to print the maze on the screen after clearing the console.
Following is the solution for this output:

```cpp
#include<iostream>
using namespace std;

void gotoxy(int, int);        → Function Prototypes
void printMaze();

main()
{
        system("cls");
        printMaze();
}
void printMaze()
{
    cout << "#########################" << endl;
    cout << "#                       #" << endl;
    cout << "#                       #" << endl;
    cout << "#                       #" << endl;
    cout << "#                       #" << endl;
    cout << "#                       #" << endl;
    cout << "#                       #" << endl;
    cout << "#                       #" << endl;
    cout << "#########################" << endl;
}
void gotoxy(int x, int y)
{
 COORD coordinates;
 coordinates.X = x;
 coordinates.Y = y;
 SetConsoleCursorPosition(GetStdHandle(STD_OUTPUT_HANDLE), coordinates);
}
```

Function Definition to print **Maze**

Function Definition to take cursor to **XY location**

Good Work. You are halfway there.

Task 03(CL): Use the gotoxy function to **print** the Pacman at **some point** in the maze.

```
C:\Windows\System32\cmd.exe
#########################
#                       #
#                       #
#   P                   #
D:\PF codes>_           #
#                       #
#                       #
#                       #
#########################
```

Pacman has been printed at the XY Location on Console and the Program finished the execution

Attached is the code snippet for the generated output mentioned above

```cpp
using namespace std;

void gotoxy(int, int);
void printMaze();
void playerMove(int x, int y);

main()
{
        system("cls");
        printMaze();
        int x = 3;
        int y = 3;
        playerMove(x,y);

}
void printMaze()
{
    cout << "#########################" << endl;
    cout << "#                       #" << endl;
    cout << "#                       #" << endl;
    cout << "#                       #" << endl;
    cout << "#                       #" << endl;
    cout << "#                       #" << endl;
    cout << "#                       #" << endl;
    cout << "#                       #" << endl;
    cout << "#########################" << endl;
}
void gotoxy(int x, int y)
{
 COORD coordinates;
 coordinates.X = x;
 coordinates.Y = y;
 SetConsoleCursorPosition(GetStdHandle(STD_OUTPUT_HANDLE), coordinates);

void playerMove(int x, int y)
{
        gotoxy(x-1, y);
        cout << " ";
        gotoxy(x, y);
        cout << "P";
        Sleep(200);
}
```

Function Prototype for Printing Pacman at the console

Function call

Function definition that Prints a blank space at the previous location and prints Pacman at the current location.

Great work, now you can print the Pacman at any location inside the maze.

Great work students! Now you can spawn the Pacman at any location inside the maze using the gotoxy function and you can control that it does not go out from the maze by using the IF Block.

Let's make Pacman move diagonally inside the maze on its own by using the learned skills.

Task 04(CL): Use the **while(true)** to print the Pacman and move horizontally **indefinitely**.

```
main()
{
        system("cls");
        printMaze();
        int x = 3;
        int y = 3;
        while(true)
        {
           playerMove(x,y);
           if(x < 20)
           {
                x = x + 1;
           }
           if(x == 20)
           {
                gotoxy(x-1, y);
                cout << " ";
                x = 3;
           }
        }
}
```
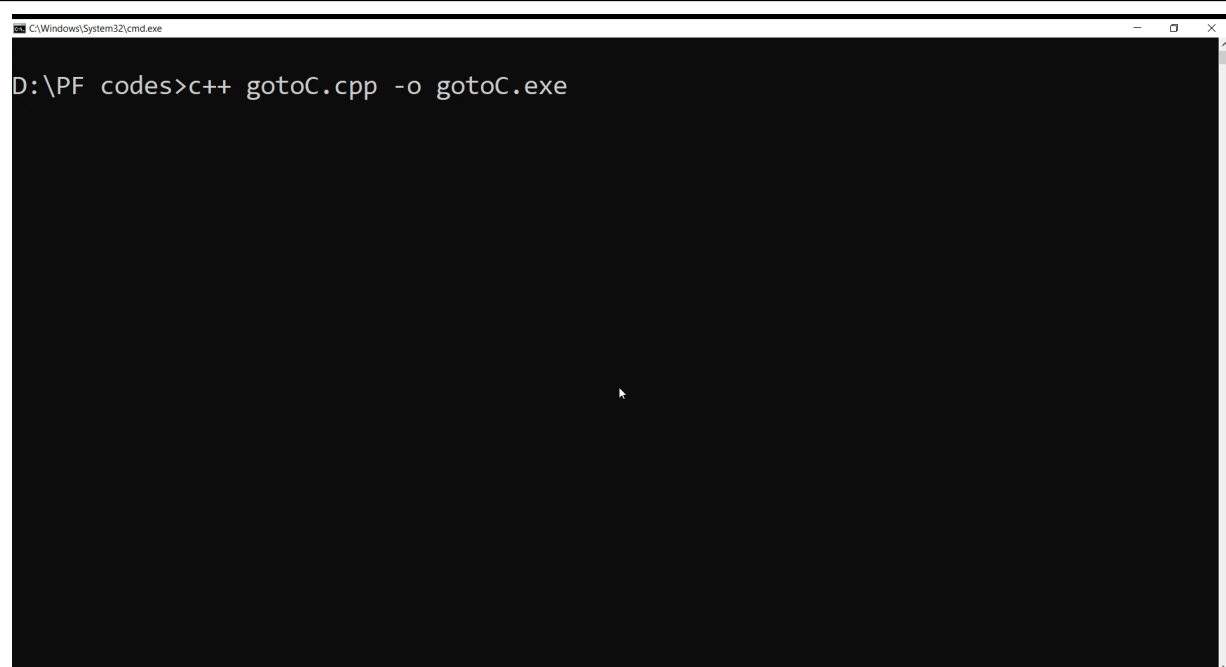
Remove Previous Pacman and Print New at XY Location.

If Pacman is inside the Maze then increase X by 1.

If Pacman has reached the end of maze, remove previous Pacman and reset X at the beginning of maze.

Attached is a gif file for the output generated by this program.

C:\Windows\System32\cmd.exe

```
D:\PF codes>c++ gotoC.cpp -o gotoC.exe
```

Great Work !!! You have learned how to make objects move

continuously using the gotoxy function, if block, and while loop.

Task 05(OP): Write a program that **prints** your name in the **center of the screen** using the **gotoxy** function.

Instruction: Print your name using **Big Alphabets**.

Task 06(OP): Write a program that prints "AWAIS" (**Vertically**) on the console screen by using **Big Alphabets**.

Instruction: Define a **separate function** for printing **each Alphabet**.

Task 07(CP): Write a program to make Pacman **patrol**(continuously move up and down) **vertically** inside the maze.

Task 08(CP):

Create a function that takes two integers and checks if they are equal or not. If they are equal then you should print on the Console "true" otherwise you should print "false" on the console.

Test Cases:

IsEqual(5, 6) ➡ false

IsEqual(1, 1) ➡ true

IsEqual(36, 35) ➡ false

Task 09(CP):

Create a function that changes true to false and false to true. Your function should take input as a string and print false if the input is true. Or it should print true if the input is false.

Test Cases:

Reverse(true) ➡ false

Reverse(false) ➡ true

Task 10(CP):

Suppose an Airline Company is giving discounts on the following bases:

Input	Discount on the Ticket Price
Pakistan	5%
Ireland	10%
India	20%
England	30%
Canada	45%

Write a function that takes the country's name, the ticket price in dollars, and then displays the final price of the ticket after the discount.

Extended Question:

Now make this program run continuously . i.e. it should take input from multiple customers until closed forcefully.

Task 11(CP):

Write a challan issuing program to tell if the car was speeding or not. If the speed is greater than 100 km/h then the car will be challenged, otherwise, the car is following the speed limit.

Test Cases

Input	Output
Speed: 105	Halt....YOU WILL BE CHALLENGED!!!
Speed: 100	Perfect! You're going good.

Task 12(CP):

A Flower shop offers three types of flowers. Red Rose, White Rose, and Tulips.

Red Rose	White Rose	Tulips
2.00 dollars/pc	4.10 dollars/pc	2.50 dollars/pc

Write a program that takes the number of red roses, white roses, tulips as input from the user, then calculates the total price of the flowers.

If the price is greater than 200$, it gives a 20% discount on the total price and prints the original price and the total payable amount after the discount on the screen.

Test Cases

Input	Output
Red Rose: 50 White Rose: 20 Tulips: 40	Original Price: 282 Price after Discount: 225.6
Red Rose: 70 White Rose:30 Tulips: 45	Original Price: 375.5 Price after Discount: 300.4

Task 13(CP):

Tom Cat likes to sleep all day, but his owner always plays with him whenever he has free time. To sleep well, the norm of games that Tom has is 30,000 minutes per year. The time for games he has depends on the holidays that his owner has.

Days	Time the Owner plays with Tom per day
Working Days	63 Minutes per day
Holidays	127 Minutes per day

Write a program that reads the number of holidays and prints whether Tom can sleep well and how much the difference from the current year's norm. It is assumed that there are 365 days in one year.

Example: 20 holidays.
The working days are 345 (365 - 20 = 345).
The time for games is 24,275 minutes (345 * 63 + 20 * 127).
The difference from the norm is 5,725 minutes (30,000 – 24,275 = 5,725) or 95 hours and 25 minutes.

Test Cases

Input	Output
Holidays: 20	Tom sleeps well 95 hours and 25 minutes less for play
Holiday: 113	Tom will run away 3 hours and 47 minutes for play

Task 14(CP): First Version of UAMS System

Write the c++ program that contains the following functions

- **printMenu()** that prints the main menu for University Admission Management System
  - Menu with the header of the university
- **calculateAggregate(name, matricMarks, interMarks, ecatMarks)** that prints the aggregate on the screen.
  - weightage Matric:30% inter:30% ecat: 40%
  - Total marks Matric:1100 inter:550 ecat: 400
- **compareMarks(nameStd1, ecatMarksStd1, nameStd2, ecatMarksStd2)**

- ○ Decide the first roll number based on whose marks are maximum after comparing the ecat marks
- ● Rest of the functionality should be provided in the main() body

```
C:\Windows\System32\cmd.exe                                        —  □  ×

D:\PF codes>c++ Week04PDUAMS.cpp -o uams.exe
```

Good Luck and Best Wishes !!

Happy Coding ahead :)