

Course: ENSF 614 - Fall 2023

Lab #: Lab 1

Instructor: Moussavi

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Submission Date: September 20, 2023

Part 1B

```
/*
 * lab1exe_B.cpp
 * ENSF 614 Lab 1, exercise B
 * Created by Mahmood Moussavi
 * Completed by: Yajur Vashisht
 */

#include <iostream>
#include <cmath>
#include <iomanip>

using namespace std;

const double G = 9.8; /* gravitation acceleration 9.8 m/s^2 */
const double PI = 3.141592654;

double degree_to_radian(double d)
{
    double r = d * PI / 180;
    return r;
}

double Projectile_travel_time(double a, double v)
{
    double r = degree_to_radian(a);
    double t = (2 * v * sin(r)) / G;
    return t;
}

double Projectile_travel_distance(double a, double v)
{
    double r = degree_to_radian(a);
    double d = v * v * sin(2 * r) / G;
    return d;
}
```

```
void create_table(double v)
{
    cout << "Angle\tt\ttd\n";
    cout << "(deg)\t(sec)\t(m)\n";
    for (double i = 0; i < 19; i++)
    {
        double a = 5 * i;
        double t = Projectile_travel_time(a, v);
        double d = Projectile_travel_distance(a, v);
        cout << a << "\t" << t << "\t" << d << "\n";
    }
}

int main(void)
{
    cout << fixed;
    cout << setprecision(2);
    double velocity;

    cout << "Please enter the velocity at which the projectile is launched (m/sec): ";
    cin >> velocity;

    if (!cin) // means if cin failed to read
    {
        cout << "Invalid input. Bye...\n";
        exit(1);
    }

    while (velocity < 0)
    {
        cout << "\npPease enter a positive number for velocity: ";
        cin >> velocity;
        if (!cin)
        {
            cout << "Invalid input. Bye...";
```

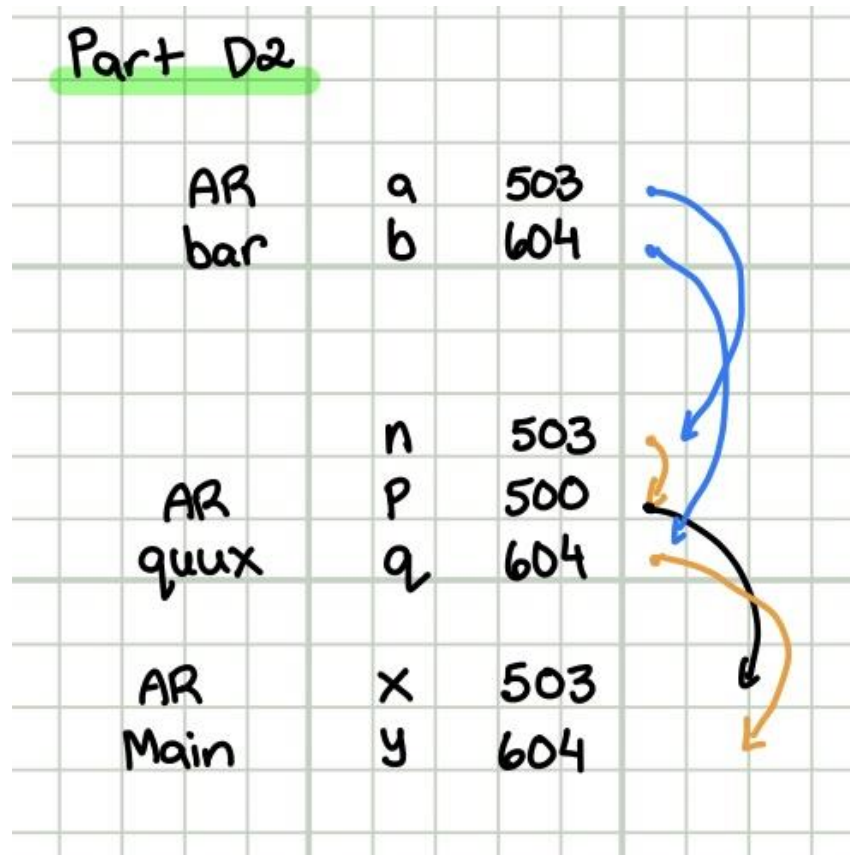
```
        exit(1);  
    }  
}  
  
create_table(velocity);  
return 0;  
}
```

Output:

```
● (base) Yajurs-Macbook:Lab 1 yajurvashisht$ cd "/Users/yajurvashisht/Library/CloudStorage/OneDrive-UniversityofCalgary/07 Classes/03 Fall 23/ENSF 614/02 Lab Assignments/Lab 1/" && g++ lablexe_B.cpp -o lablexe_B && "/Users/yajurvashisht/Library/CloudStorage/OneDrive-UniversityofCalgary/07 Classes/03 Fall 23/ENSF 614/02 Lab Assignments/Lab 1/"lablexe_B
Please enter the velocity at which the projectile is launched (m/sec): 69
Angle      t          d
(deg)      (sec)      (m)
0.00      0.00      0.00
5.00      1.23      84.36
10.00     2.45     166.16
15.00     3.64     242.91
20.00     4.82     312.28
25.00     5.95     372.16
30.00     7.04     420.73
35.00     8.08     456.52
40.00     9.05     478.44
45.00     9.96     485.82
50.00    10.79     478.44
55.00    11.53     456.52
60.00    12.20     420.73
65.00    12.76     372.16
70.00    13.23     312.28
75.00    13.60     242.91
80.00    13.87     166.16
85.00    14.03     84.36
90.00    14.08     -0.00
```

Part D-II

Part D2



Part E

```
/*  
 * lab1exe_E.cpp  
 * ENSF 619 Lab 1 Exercise E1  
 * By: Yajur Vashisht  
 */  
  
#include <iostream>  
using namespace std;  
  
void time_convert(int ms_time, int *minutes_ptr, double *seconds_ptr);  
  
int main(void)  
{  
    int millisec;  
    int minutes;  
    double seconds;  
  
    cout << "Enter a time interval as an integer number of milliseconds: ";  
  
    // Prompt the user to enter milliseconds and store it in millisec.  
    cin >> millisec;  
  
    if (!cin)  
    {  
        cout << "Unable to convert your input to an int.\n";  
        exit(1);  
    }  
  
    cout << "Doing conversion for input of " << millisec << " milliseconds ... \n";  
  
    // Call the time_convert function  
    time_convert(millisec, &minutes, &seconds);  
  
    cout << "That is equivalent to " << minutes << " minute(s) and " << seconds << " second(s).\n";  
    return 0;  
}
```

```

}

// Define the time_convert function
void time_convert(int ms_time, int *minutes_ptr, double *seconds_ptr)
{
    // Calculate minutes and remaining milliseconds
    *minutes_ptr = ms_time / (1000 * 60); // 1000 ms in a second, 60 seconds in a minute
    ms_time %= (1000 * 60);

    // Convert remaining milliseconds to seconds
    *seconds_ptr = static_cast<double>(ms_time) / 1000.0;
}

```

Output:

```

● (base) Yajurs-Macbook:Lab 1 yajurvashisht$ cd "/Users/yajurvashisht/Library/CloudStorage/OneDrive-UniversityofCalgary/07 Classes/03 Fall 23/ENSF 614/02 Lab Assignments/Lab 1/" && g++ lablexe_E.cpp -o lablexe_E && "/Users/yajurvashisht/Library/CloudStorage/OneDrive-UniversityofCalgary/07 Classes/03 Fall 23/ENSF 614/02 Lab Assignments/Lab 1/"lablexe_E
Enter a time interval as an integer number of milliseconds: 149285123
Doing conversion for input of 149285123 milliseconds ...
That is equivalent to 2488 minute(s) and 5.123 second(s).

```