Course: ENSF 614 - Fall 2023

Lab B01: Lab 1

Instructor: Mahmood Moussavi

Student Name: Braden Tink

Submission Date: September , 2023

Lab1 Exe A (Omited)

Lab1 Exe B

Code

```
/*
 *  lab1exe_B.cpp
 *  ENSF 614 Lab 1, exercise B
 *  Created by Mahmood Moussavi
 *  Completed by: Braden Tink
 *  Submission Date: Sept 20, 2023
 */
#include <iostream>
#include <cmath>
using namespace std;

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

void create_table(double v);
double Projectile_travel_time(double a, double v);
double Projectile_travel_distance(double a, double v);
double degree_to_radian(double d);

void create_table(double v){
        double angle;
        double radians;
        double distance;
        double time;

        cout << "Angle                   t                   d\n";
        cout << "(deg)           (sec)           (m)\n";
        angle = 0;
        while ( angle <= 90){
                radians = degree_to_radian(angle);

                distance = Projectile_travel_distance(radians, v);
                time = Projectile_travel_time(radians, v);

                cout << angle << "              " << time << "          " << distance << "\n";
                angle += 5.0;
        }
}

double Projectile_travel_time(double a, double v){
        return  ((2*v*sin(a))/G);
}
```

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

double degree_to_radian(double d){
        return (d*PI)/180;
}
int main(void)
{
   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 << "Invlid input. Bye...\n";
      exit(1);
   }

   while (velocity < 0 )
   {
      cout << "\nplease enter a positive number for velocity: ";
      cin >> velocity;
      if(!cin)
      {
         cout << "Invlid input. Bye...";
         exit(1);
      }
   }
         create_table(velocity);

   return 0;
}
```

Output

```
Braden@TBLaptop04 /cygdrive/c/users/braden/documents/school/ENSF 614/assignments
/Assignment 1
$ ./a.exe
Please enter the velocity at which the projectile is launched (m/sec): 10
Angle           t               d
(deg)           (sec)           (m)
0               0               0
5               0.177869        1.77192
10              0.354384        3.49
15              0.528202        5.10204
20              0.698           6.55906
25              0.862486        7.81678
30              1.02041         8.83699
35              1.17056         9.5887
40              1.31181         10.0491
45              1.44308         10.2041
50              1.56336         10.0491
55              1.67174         9.5887
60              1.7674          8.83699
65              1.84961         7.81678
70              1.91774         6.55906
75              1.97128         5.10204
80              2.00981         3.49
85              2.03305         1.77192
90              2.04082         -4.18578e-09
```

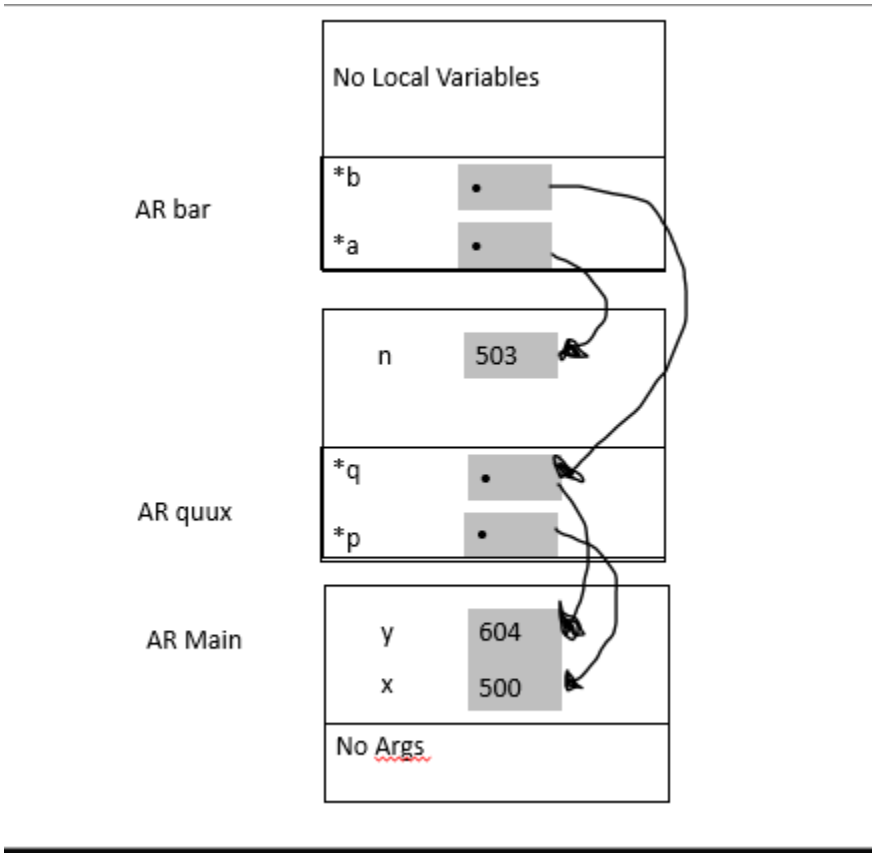
Lab1 Exe C

(Omitted)

Lab1 Exe D

Part 1 (Omitted)

Part 2



Lab1 Exe E

Code

```
/*
 *  lab1exe_E.cpp
 *  ENSF 614 Lab 1, exercise E
 *  Created by Mahmood Moussavi
 *  Completed by: Braden Tink
 *  Submission Date: Sept 20, 2023
 */

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

```
void time_convert(int ms_time, int *minutes_ptr, double *seconds_ptr);
/*
 * Converts time in milliseconds to time in minutes and seconds.
 * For example, converts 123400 ms to 2 minutes and 3.4 seconds.
 * REQUIRES:
 *    ms_time >= 0.
 *    minutes_ptr and seconds_ptr point to variables.
 * PROMISES:
 *    0 <= *seconds_ptr & *seconds_ptr < 60.0
 *    *minutes_ptr minutes + *seconds_ptr seconds is equivalent to
 *    ms_time ms.
 */

int main(void)
{
        int millisec;
        int minutes;
        double seconds;


        cout << "Enter a time interval as an integer number of milliseconds: ";

        // printf("Enter a time interval as an integer number of milliseconds: ");
        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,";

        time_convert(millisec, &minutes, &seconds);

        /* MAKE A CALL TO time_convert HERE. */
        cout << "That is equivalent to " << minutes << " minute(s) and " << seconds << "
second(s).\n";
        return 0;
}

/* PUT YOUR FUNCTION DEFINITION FOR time_convert HERE. */
void time_convert(int ms_time, int *minutes_ptr, double *seconds_ptr){
        int remainder;

        if (ms_time <= 60000){
                *minutes_ptr = 0;
                *seconds_ptr = (ms_time / 1000);
        }
        else{
                remainder = ms_time % 60000;
```

```
                *minutes_ptr = (ms_time /60000);
                *seconds_ptr = (remainder / 1000);
        }

}
```

Output