Course: ENSF 337 – Fall 2020

Post Lab #: 1

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Lab Section: B01

Submission Date: 9/17/2020

```c
/*
 *  lablexe_B.c
 *  ENSF 337 - Fall 2020 Lab 1, exercise B
 *  Lab Section B01
 *  Completed by: Matthew Ho(30052684)
 *  Submission Date: 9/17/2020
 */

#include <stdio.h>
#include <stdlib.h>
#include <math.h>

#define G 9.8   /* G is a constant: gravitation acceleration 9.8 m/s^2 */
#define PI 3.141592654  /* PI is constant */

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);


int main(void)
{
    int n;
    double velocity;

    printf ("please enter the velocity at which the projectile is launched (m/sec): ");
    n = scanf("%lf" ,&velocity);

    if(n != 1)
    {
        printf("Invlid input. Bye...");
        exit(1);
    }

    while (velocity < 0 )
    {
        printf ("please enter a positive number for velocity: ");
        n = scanf("%lf", &velocity);
        if(n != 1)
        {
            printf("Invlid input. Bye...");
            exit(1);
        }
    }

    create_table(velocity);

    return 0;
}
```

```c
52
53    double Projectile_travel_time(double a, double v)
54  ┌ {
55        double t;
56        double rad;
57
58        rad = degree_to_radian(a);
59        t = 2*v*sin(rad)/G;
60
61        return t;
62  └ }
63
64    double Projectile_travel_distance(double a, double v)
65  ┌ {
66        double d;
67        double rad;
68
69        rad = degree_to_radian(a);
70        d = pow(v, 2)*sin(2*rad)/G;
71
72        return d;
73
74  └ }
75
76    double degree_to_radian(double deg)
77  ┌ {
78        double rad;
79        rad = deg*PI/180;
80
81        return rad;
82  └ }
83
84
85    void create_table(double v)
86  ┌ {
87        double angle;
88        double time;
89        double distance;
90
91
92        printf("Angle                              t                            d\n");
93        printf(" (deg)                          (sec)                        (m) \n");
94
95        while(angle < 95)
96      ┌ {
97            time = Projectile_travel_time(angle, v);
98            distance = Projectile_travel_distance(angle, v);
99            printf("%lf                    %lf                    %lf \n", angle, time, distance);
100           angle = angle + 5;
101     └ }
102
103 └ }
104
105
106
107   /* UNCOMMENT THE CALL TO THE create_table IN THE main FUNCTION, AND COMPLETE THE PROGRAM */
108
```

```
matth@DESKTOP-Q3LAO5I ~
$ cd c:Users/matth/Desktop

matth@DESKTOP-Q3LAO5I /cygdrive/c/Users/matth/Desktop
$ gcc -Wall lab1exe_B.c

matth@DESKTOP-Q3LAO5I /cygdrive/c/Users/matth/Desktop
$ ./a.exe
please enter the velocity at which the projectile is launched (m/sec): Invlid
matth@DESKTOP-Q3LAO5I /cygdrive/c/Users/matth/Desktop
$ ./a.exe
please enter the velocity at which the projectile is launched (m/sec): 5
Angle                          t                        d
(deg)                        (sec)                     (m)
0.000000                    0.000000                  0.000000
5.000000                    0.088934                  0.442980
10.000000                   0.177192                  0.872500
15.000000                   0.264101                  1.275510
20.000000                   0.349000                  1.639764
25.000000                   0.431243                  1.954195
30.000000                   0.510204                  2.209248
35.000000                   0.585282                  2.397175
40.000000                   0.655906                  2.512265
45.000000                   0.721538                  2.551020
50.000000                   0.781678                  2.512265
55.000000                   0.835869                  2.397175
60.000000                   0.883699                  2.209248
65.000000                   0.924804                  1.954195
70.000000                   0.958870                  1.639764
75.000000                   0.985639                  1.275510
80.000000                   1.004906                  0.872500
85.000000                   1.016525                  0.442980
90.000000                   1.020408                 -0.000000

matth@DESKTOP-Q3LAO5I /cygdrive/c/Users/matth/Desktop
$
```

Point 1

AR MAIN

X [2]

Y [8]

Z [10]

No arguments

AR
Jupiter

d [10]

i [2]   j [10]

AR
Mercury

t [6]

M [2]   n [2]

Point 2

AR MAIN

X [2]	Z [10]
Y [8]	

No arguments

AR jupiter

d [6]	
i [2]	j [10]

Point 3

AR MAIN	X [2] Z [10] Y [8]
	No arguments