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| **Course: ENSF 614 – Fall 2023**  **Lab #:** Lab 1  **Instructor:** Moussavi  **Student Name:** Yajur Vashisht  **Submission Date:** September 20, 2023 |

**Part 1B**

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*\* 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\t\td\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:**

A screen shot of a computer

Description automatically generated

**Part D-II**

A graph paper with writing on it

Description automatically generated

**Part E**

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*\* 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:**

