Muhammad Hammad (23K-2005)

PF LAB 04

TASK 01:

TASK 1.c [*] TASK 2.c

```c
#include <stdio.h>
#include <math.h>

int main () {

    float s_length=30,angle=60,angle_rad=0,h=0,pi=M_PI;
    angle_rad = angle * (pi/180);
    h=s_length*tan(angle_rad);
    printf("(A) The height of the pole is %.2f meters", h);

    s_length=40,angle=45,angle_rad=0,h=0,pi=M_PI;
    angle_rad = angle * (pi/180);
    h=s_length*tan(angle_rad);
    printf("\n(B) The height of the pole is %.2f meters", h);

    s_length=15,angle=75,angle_rad=0,h=0,pi=M_PI;
    angle_rad = angle * (pi/180);
    h=s_length*tan(angle_rad);
    printf("\n(C) The height of the pole is %.2f meters", h);

    s_length=50,angle=30,angle_rad=0,h=0,pi=M_PI;
    angle_rad = angle * (pi/180);
    h=s_length*tan(angle_rad);
    printf("\n(D) The height of the pole is %.2f meters", h);

    return 0;
}
```

```
C:\Users\test23\Desktop\LAB 4 TASKS - HAMMAD\TASK 1....
(A) The height of the pole is 51.96 meters
(B) The height of the pole is 40.00 meters
(C) The height of the pole is 55.98 meters
(D) The height of the pole is 28.87 meters
--------------------------------
Process exited after 0.009816 seconds with return value 0
Press any key to continue . . .
```

TASK 02:

TASK 1.c TASK 2.c

```c
#include <stdio.h>
#include <math.h>
#include<stdbool.h>
int main () {
    int a=4,b=3,c;
    c=a+b; // Using Arithmetic Addition Operator
    printf("(a) 4 + 3 = %d\n",c);

    a=6, b=3,c;
    c=a/b; // Using Arithmetic Division Operator
    printf("(b) 6/3 = %d\n",c);

    int d=0, e=1,f;
    f=d||e; // Using Logical OR Operator
    printf("(c) %d\n",f);

    a=15, b=2;
    c=a%b; // Using Arithmetic MOD Operator
    printf("(d) 15 MOD 2 = %d\n",c);

    a=6, b=9,c; // Using IF and RELATIONAL Operator
    if(c=6<9); {
    printf("(e) 6 < 9 = %d\n",c); }

    a=35, b=75,c;
    c=a%b; // Using Arithmetic MOD Operator
    printf("(f) 35 MOD 75 = %d\n",c);

    a='B'>'J'; // Using Relational Operator
    printf("(g) \"B\" > \"J\" = %d \n",a);


    a=0,b=1;
    c=a+b;
    d=(c!=1); // Using Relational (NOT EQUAL TO) Operator and printing
    printf("(h) %d\n",d);


    float p=35,q=60,r;
    r=p/q; // Using Arithmetic Division Operator
    printf("(i) 35/60 = %.2f\n",r);

    d=0, e=1;
    f=d+e; // Using Relational Operators
    printf("(j) %d AND %d\n", f!=1, f==1);

    p=30, q=0.25,r;
    r=p*q; // Using Arithmetic Multiplication Operator
    printf("(k) 30 * 0.25 = %.3f\n",r);

    a=45,b=45;
    c= a>= b; // Using Relational Operator
    printf("(l) 45 >= 45 = %d",c);


    return 0;
}
```

```
C:\Users\test23\Desktop\LAB 4 TASKS - HAMMAD\TASK 2....
(a) 4 + 3 = 7
(b) 6/3 = 2
(c) 1
(d) 15 MOD 2 = 1
(e) 6 < 9 = 1
(f) 35 MOD 75 = 35
(g) "B" > "J" = 0
(h) 0
(i) 35/60 = 0.58
(j) 0 AND 1
(k) 30 * 0.25 = 7.500
(l) 45 >= 45 = 1
--------------------------------
Process exited after 0.02201 seconds with return value 0
Press any key to continue . . .
```

TASK 03:

The accuracy of floats is very less due to which they do not add up to the binary value of 0.3.

Task 04:

main.c

```c
#include <stdio.h>
#include <math.h>

int main()
{
    float v=0,r=0,w=40;

    // PART A
    r = 0.7;
    v = r*w;
    printf("The  magnitude of the linear velocity of a point located at %.2f meters from the center is %.2f m/s\n", r, v);

    // PART B

    r = 3;
    v = r*w;
    printf("The  magnitude of the linear velocity of a point located at %.2f meters from the center is %.2f m/s\n", r, v);

    // PART C

    r = 4;
    v = r*w;
    printf("The  magnitude of the linear velocity of a point located at %.2f meters from the center is %.2f m/s\n", r, v);


    return 0;
}
```

input

```
The  magnitude of the linear velocity of a point located at 0.70 meters from the center is 28.00 m/s
The  magnitude of the linear velocity of a point located at 3.00 meters from the center is 120.00 m/s
The  magnitude of the linear velocity of a point located at 4.00 meters from the center is 160.00 m/s


...Program finished with exit code 0
Press ENTER to exit console.
```

TASK 05:

main.c

```c
#include <stdio.h>
#include <math.h>

int main () {

    float v,u=0,a=16,s=200;

    v = u*u + 2*a*s;
    v = sqrtf(v);
    printf("The stone will hit the ground with the velocity %.2f m/s", v);

    return 0;
}
```

input

```
The stone will hit the ground with the velocity 80.00 m/s

...Program finished with exit code 0
Press ENTER to exit console.
```

TASK 06:

main.c

```c
#include <stdio.h>
#include <math.h>

int main()
{
    float d=0,angle=0,v0=0,h=0, angle_rad=0, x_axis=0, y_axis=0, t=0, pi = M_PI, vx=0, vy=0, g=9.8,vf=0;


    printf("Enter the distance (d) in meters = ");
    scanf("%f", &d);
    printf("Enter the angle (θ) in degree = ");
    scanf("%f", &angle);
    printf("Enter the initial velocity (v0) in m/s = ");
    scanf("%f", &v0);
    printf("Enter the height (h) in meters = ");
    scanf("%f", &h);

    angle_rad = angle * (pi/180);
    x_axis = cos(angle_rad);
    y_axis = sin(angle_rad);
    t = d / (v0 * x_axis);
    vx = v0 * x_axis;
    vy = v0 * (y_axis - (g * t));
    vf = sqrtf((vx*vx) + (vy*vy));

    printf("\n(Part A) The time taken for the rocket to reach the target = %.2f seconds.\n", t);
    printf("(Part B) The final velocity of the rocket when it reaches the target = %.2f m/s\n", vf);
    printf("(Part C) The x-axis angle at which the rocket is launched = %.2f radians.\n", x_axis);
    printf("(Part D) The y-axis angle at which the rocket is launched = %.2f radians.\n", y_axis);


    return 0;
}
```

input

```
Enter the distance (d) in meters = 50
Enter the angle (θ) in degree = 60
Enter the initial velocity (v0) in m/s = 70
Enter the height (h) in meters = 80

(Part A) The time taken for the rocket to reach the target = 1.43 seconds.
(Part B) The final velocity of the rocket when it reaches the target = 920.04 m/s
(Part C) The x-axis angle at which the rocket is launched = 0.50 radians.
(Part D) The y-axis angle at which the rocket is launched = 0.87 radians.


...Program finished with exit code 0
Press ENTER to exit console.
```