

Programming Methodology - SE1012

Lab 3

IT23613522

Activity 1

```
vboxuser@Ubunt: ~/IT23613522
#include <stdio.h>

int main(void) {
    double height, flow;
    const double density = 1000.0;
    const double g = 9.8;
    const double efficiency = 0.9;
    double power_watts, power_megawatts;

    printf("Enter height of the dam (meters): ");
    if (scanf("%lf", &height) != 1) return 1;
    printf("Enter flow rate (cubic meters per second): ");
    if (scanf("%lf", &flow) != 1) return 1;

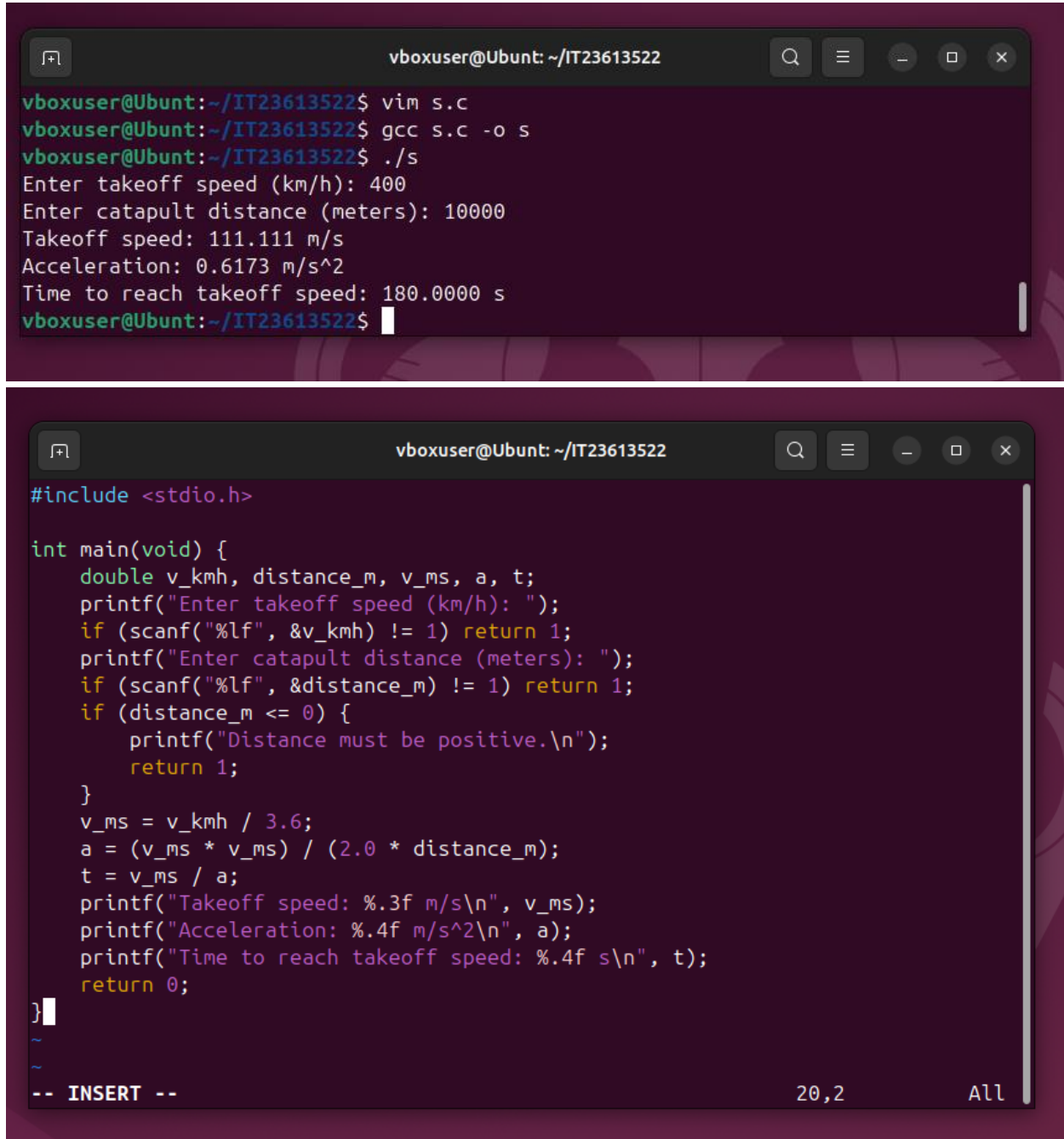
    power_watts = efficiency * density * flow * g * height;
    power_megawatts = power_watts / 1e6;

    printf("Predicted power: %.2f W (%.2f MW)\n", power_watts, power_megawatts);
    return 0;
}

20,1 All
```

```
vboxuser@Ubunt: ~/IT23613522
vboxuser@Ubunt:~$ cd IT23613522
vboxuser@Ubunt:~/IT23613522$ vim s.c
vboxuser@Ubunt:~/IT23613522$ gcc s.c -o s
vboxuser@Ubunt:~/IT23613522$ ./s
Enter height of the dam (meters): 500
Enter flow rate (cubic meters per second): 50
Predicted power: 220500000.00 W (220.50 MW)
vboxuser@Ubunt:~/IT23613522$
```

Activity 2



The image consists of two screenshots of a terminal window. The top screenshot shows the execution of a C program. The user enters the takeoff speed (400 km/h) and the catapult distance (10000 meters). The program outputs the takeoff speed in m/s (111.111), the acceleration (0.6173 m/s^2), and the time to reach takeoff speed (180.0000 s). The bottom screenshot shows the source code of the program, which includes `<stdio.h>` and defines a `main` function. The program prompts the user for takeoff speed and catapult distance, validates the inputs, and calculates the takeoff speed in m/s, acceleration, and time to reach takeoff speed.

```
vboxuser@Ubuntu: ~/IT23613522
vboxuser@Ubuntu:~/IT23613522$ vim s.c
vboxuser@Ubuntu:~/IT23613522$ gcc s.c -o s
vboxuser@Ubuntu:~/IT23613522$ ./s
Enter takeoff speed (km/h): 400
Enter catapult distance (meters): 10000
Takeoff speed: 111.111 m/s
Acceleration: 0.6173 m/s^2
Time to reach takeoff speed: 180.0000 s
vboxuser@Ubuntu:~/IT23613522$
```

```
#include <stdio.h>

int main(void) {
    double v_kmh, distance_m, v_ms, a, t;
    printf("Enter takeoff speed (km/h): ");
    if (scanf("%lf", &v_kmh) != 1) return 1;
    printf("Enter catapult distance (meters): ");
    if (scanf("%lf", &distance_m) != 1) return 1;
    if (distance_m <= 0) {
        printf("Distance must be positive.\n");
        return 1;
    }
    v_ms = v_kmh / 3.6;
    a = (v_ms * v_ms) / (2.0 * distance_m);
    t = v_ms / a;
    printf("Takeoff speed: %.3f m/s\n", v_ms);
    printf("Acceleration: %.4f m/s^2\n", a);
    printf("Time to reach takeoff speed: %.4f s\n", t);
    return 0;
}
```

-- INSERT -- 20,2 All