



Data Structure Lab

Lab-1

Submitted by:

Aakash Bhatt

500124633

(2023-2024)

Submitted to:

Pankaj Sir

Q1. Ramesh's basic salary is input through the keyboard. His dearness allowance is 40% of basic salary, and house rent allowance is 20% of basic salary. Write a program to calculate his gross salary.

```
#include <stdio.h>
int main()
{
    // Variable declarations
    int basic_salary;    // Stores the basic salary as an integer
    float gross_salary, DA, HRA;    // Stores gross salary, Dearness Allowance (DA), and House Rent Allowance (HRA) as floating-point numbers

    // Prompt the user to enter the basic salary
    printf("Enter the basic salary: ");
    scanf("%d", &basic_salary);    // Read the input from the user and store it in 'basic_salary' using the address-of (&) operator

    DA = basic_salary * 40 / 100;    // DA is 40% of the basic salary
    HRA = basic_salary * 20 / 100;    // HRA is 20% of the basic salary

    // Calculate the gross salary by adding the basic salary, DA, and HRA
    gross_salary = basic_salary + DA + HRA;

    // Print the calculated values to the console
    printf("\n Basic Salary: %.2f", basic_salary);    // %.2f formats the float with two decimal places
    printf("\n Dearness Allowance: %.2f", DA);
    printf("\n House Rent Allowance: %.2f", HRA);
    printf("\n Gross Salary: %.2f", gross_salary);

    return 0;    // Indicate successful program execution by returning 0
}
```

```
PS D:\MCA\MCA-DSA> cd .\LAB-1\
PS D:\MCA\MCA-DSA\LAB-1> gcc .\Question1.c
PS D:\MCA\MCA-DSA\LAB-1> .\a.exe
Enter the basic salary :100000

Basic Salary: -1.#R
Dearness Allowance: 40000.00
House Rent Allowance: 20000.00
Gross Salary: 160000.00
PS D:\MCA\MCA-DSA\LAB-1> █
```

Q2. The distance between two cities (in km.) is input through the keyboard. Write a program to convert and print this distance in meters, feet, inches and centimeters.

```
#include <stdio.h>
int main()
{
    // Variable declarations to store the distances in various units
    float distance, miles, inches, centimeter, meter;

    // Prompt the user to enter the distance in kilometers
    printf("Enter the distance in km: ");
    scanf("%f", &distance); // Read the input from the user and store it
    in 'distance'

    // Convert the distance to miles, inches, centimeters, and meters
    miles = distance * 0.62137119; //Conversion factor for km to miles
    inches = distance * 39370.1; //Conversion factor for km to inches
    centimeter = distance * 100000; // Conversion factor for km to cm
    meter = distance * 1000; // Conversion factor for km to m

    // Print the converted distances to the console
    printf("Distance in centimeters: %f\n", centimeter);
    printf("Distance in inches: %f\n", inches);
    printf("Distance in miles: %f\n", miles);
    printf("Distance in meters: %f", meter);

    return 0; // Indicate successful program execution by returning 0
}
```

```
PS D:\MCA\MCA-DSA> cd .\LAB-1\
PS D:\MCA\MCA-DSA\LAB-1> gcc .\Question2.c
PS D:\MCA\MCA-DSA\LAB-1> .\a.exe
Enter the distance in km :67
Distance in centimeters 6700000.000000
Distance in inches 2637796.750000
Distance in miles 41.631870
Distance in meter 67000.000000
PS D:\MCA\MCA-DSA\LAB-1> □
```

Q3. If the marks obtained by a student in five different subjects are input through the keyboard, find out the aggregate marks and percentage marks obtained by the student. Assume that the maximum marks that can be obtained by a student in each subject is 100.

```
#include <stdio.h>
void main()
{
    // Variable declarations to store marks and calculations
    int subject1, subject2, subject3, subject4, subject5, total;
    float percentage;
    // Prompt the user to enter the marks for each subject
    printf("Enter the marks of Subject1: ");
    scanf("%d", &subject1);
    printf("Enter the marks of Subject2: ");
    scanf("%d", &subject2);
    printf("Enter the marks of Subject3: ");
    scanf("%d", &subject3);
    printf("Enter the marks of Subject4: ");
    scanf("%d", &subject4);
    printf("Enter the marks of Subject5: ");
    scanf("%d", &subject5);
    // Calculate the total marks
    total = subject1 + subject2 + subject3 + subject4 + subject5;
    // Calculate the percentage by dividing the total marks by the number
    of subjects (5 in this case)
    percentage = total / 5;

    // Print the aggregate marks and percentage marks to the console
    printf("\nAggregate marks: %d", total);
    printf("\nPercentage marks: %0.2f %%", percentage);
}
```

```
PS D:\MCA\MCA-DSA\LAB-1> gcc .\Question3.c
PS D:\MCA\MCA-DSA\LAB-1> .\a.exe
Enter the marks of Subject1: 98
Enter the marks of Subject2: 87
Enter the marks of Subject3: 68
Enter the marks of Subject4: 78
Enter the marks of Subject5: 91

Aggregate marks: 422
Percentage marks: 84.00 %
PS D:\MCA\MCA-DSA\LAB-1> □
```

Q4. Temperature of a city in Fahrenheit degrees is input through the keyboard. Write a program to convert this temperature into Centigrade degrees.

```
#include <stdio.h>

int main()
{
    // Variable declarations to store temperature values
    float fahrenheit, centigrade;

    // Prompt the user to enter the temperature in Fahrenheit
    printf("Enter Temperature in Fahrenheit: ");
    scanf("%f", &fahrenheit); // Read the input from the user and store it in 'fahrenheit' using the address-of (&) operator

    // Convert Fahrenheit to Centigrade (Celsius)
    centigrade = (fahrenheit - 32) * 5 / 9;

    // Print the temperature in Centigrade (Celsius) to the console
    printf("The Temperature in Centigrade Degree: %.2f", centigrade);

    return 0; // Indicate successful program execution by returning 0
}
```

```
PS D:\MCA\MCA-DSA\LAB-1> gcc .\Question4.c
PS D:\MCA\MCA-DSA\LAB-1> .\a.exe
Enter Temperature in Fahrenheit: 92
The Temperature in Centigrade Degree: 33.33
PS D:\MCA\MCA-DSA\LAB-1> █
```

Q5. The length & breadth of a rectangle and radius of a circle are input through the keyboard. Write a program to calculate the area & perimeter of the rectangle, and the area & circumference of the circle.

```
#include <stdio.h>
int main()
{
    // Variable declarations to store the measurements and calculations
```

```
float length, breadth, radius, areaOfCircle, circumference_Circle,
areaOfRect, perimeterOfRectangle;

// For rectangle
printf("Enter the length of rectangle: ");
scanf("%f", &length); // Read the length of the rectangle from the user

printf("Enter the breadth of rectangle: ");
scanf("%f", &breadth); // Read the breadth of the rect from the user
// For circle
printf("Enter the radius of circle: ");
scanf("%f", &radius); // Read the radius of the circle from the user

// Calculate area & perimeter of the rectangle...
areaOfRect = length * breadth; // Area of Rectangle = Length x Breadth
perimeterOfRectangle = 2 * (length + breadth); // Perimeter of
Rectangle = 2 * (Length + Breadth)

// Calculate area & circumference of the circle...
areaOfCircle = 3.14 * radius * radius; // Area of Circle = Pi * r^2
where Pi = 3.14
circumference_Circle = 2 * 3.14 * radius; // Circumference of Circle
= 2 * Pi * r

// Print the calculated values to the console
printf("\nThe area of the rectangle: %0.2f", areaOfRect);
printf("\nThe perimeter of the rectangle: %0.2f",
perimeterOfRectangle);
printf("\n\nThe area of the circle: %0.2f", areaOfCircle);
printf("\nThe circumference of the circle: %0.2f",
circumference_Circle);

return 0; // Indicate successful program execution by returning 0
}
```

```
PS D:\MCA\MCA-DSA\LAB-1> gcc .\Question5.c
```

```
PS D:\MCA\MCA-DSA\LAB-1> .\a.exe
```

```
Enter the length of rectangle: 10
```

```
Enter the breadth of rectangle: 20
```

```
Enter the radius of circle: 5
```

```
The area of the rectangle: 200.00
```

```
The perimeter of the rectangle: 60.00
```

```
The area of the circle: 78.50
```

```
The circumference of the circle: 31.40
```

```
PS D:\MCA\MCA-DSA\LAB-1> █
```

Q6.The Paper of size A0 has dimensions 1189 mm * 841mm.Each subsequent size A(n) is defined as A(n-1) cut in half parallel to its shorter sides. Thus paper of size A1would have dimensions 841mm * 594mm. Write a program to calculate and print paper sizes A0,A1,A2....A8.

```
#include <stdio.h>

int main()
{
    // Variable declarations to store the length and breadth
    int length, breadth;
    // Variables to store intermediate calculations for length and breadth
    float l1, l2, l3, l4, l5, l6, l7, l8;
    float b1, b2, b3, b4, b5, b6, b7, b8;

    // Prompt the user to enter the length and breadth
    printf("Please enter the length and breadth: ");
    scanf("%d %d", &length, &breadth); // Read the input from the user and store it in 'length' and 'breadth'

    // Calculate the intermediate lengths (l1 to l8) and breadths (b1 to b8) using halving method
    l1 = length / 2;
    l2 = l1 / 2;
    l3 = l2 / 2;
    l4 = l3 / 2;
    l5 = l4 / 2;
    l6 = l5 / 2;
    l7 = l6 / 2;
    l8 = l7 / 2;
    b1 = breadth / 2;
    b2 = b1 / 2;
    b3 = b2 / 2;
    b4 = b3 / 2;
    b5 = b4 / 2;
    b6 = b5 / 2;
    b7 = b6 / 2;
    b8 = b7 / 2;

    // Print the calculated values (A0 to A8) to the console
    printf("A0 - %f %f\n", l1, b1);
    printf("A1 - %f %f\n", l1, b1);
```



```
printf("A2 - %f %f\n", l2, b2);  
printf("A3 - %f %f\n", l3, b3);  
printf("A4 - %f %f\n", l4, b4);  
printf("A5 - %f %f\n", l5, b5);  
printf("A6 - %f %f\n", l6, b6);  
printf("A7 - %f %f\n", l7, b7);  
printf("A8 - %f %f\n", l8, b8);  
  
return 0; // Indicate successful program execution by returning 0  
}
```

```
PS D:\MCA\MCA-DSA\LAB-1> gcc .\Question6.c  
PS D:\MCA\MCA-DSA\LAB-1> .\a.exe  
Please enter the length and bredth :1189 841  
A0 -594.000000 420.000000  
A1 -594.000000 420.000000  
A2 -297.000000 210.000000  
A3 -148.500000 105.000000  
A4 -74.250000 52.500000  
A5 -37.125000 26.250000  
A6 -18.562500 13.125000  
A7 -9.281250 6.562500  
A8 -4.640625 3.281250  
PS D:\MCA\MCA-DSA\LAB-1> █
```