

EXPERIMENT NO. : 3-1

Conditional Statements

- 1.) WAP to take check if the triangle is valid or not. If the validity is established, do check if the triangle is isosceles, equilateral, right angle, or scalene. Take sides of the triangle as input from a user.

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

```
int main ()  
{
```

```
int a, b, c;
```

```
printf ("Enter the three sides of the triangle : ");  
scanf ("%d %d %d", &a, &b, &c);
```

```
if ((a + b > c) && (a + c > b) && (b + c > a)) {  
    printf ("The triangle is valid. \n");
```

```
}  
if (a == b && b == c) {  
    printf ("The triangle is Equilateral. \n");
```

```
}  
else if (a == b || b == c || a == c) {  
    printf ("The triangle is Isosceles. \n");
```

```
}  
if ((a * a + b * b == c * c) ||  
    (a * a + c * c == b * b) ||  
    (b * b + c * c == a * a)) {
```

```
printf ("The triangle is Right-angled. \n");  
}  
if (a != b && b != c && a != c) {  
    printf ("The triangle is Scalene. \n");  
}  
} else {  
    printf ("The triangle is not valid. \n");  
}  
  
return 0;  
}
```

Output : Enter the three sides of the triangle :
3 4 5

The triangle is valid.

The triangle is Right-angled.

The triangle is Scalene.

main.c

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```
3 int main() {
4     int a, b, c;
5
6     printf("Enter the three sides of the triangle:\n");
7     scanf("%d %d %d", &a, &b, &c);
8
9     if (a + b > c && a + c > b && b + c > a) {
10         printf("The triangle is VALID.\n");
11
12         if (a == b && b == c) {
13             printf("The triangle is EQUILATERAL.\n");
14         }
15         else if (a == b || b == c || a == c) {
16             printf("The triangle is ISOSCELES.\n");
17         }
18         else {
19             printf("The triangle is SCALENE.\n");
20         }
21
22         if ((a * a + b * b == c * c) ||
23             (a * a + c * c == b * b) ||
24             (b * b + c * c == a * a)) {
25             printf("The triangle is RIGHT-ANGLED.\n");
26         }
27     } else {
28         printf("The triangle is NOT VALID.\n");
29     }
30
31     return 0;
32 }
```

Output

Clear

Enter the three sides of the triangle:
3 4 5
The triangle is VALID.
The triangle is SCALENE.
The triangle is RIGHT-ANGLED.

=== Code Execution Successful ===

2) WAP to compute the BMI Index of the person and print the BMI values as per the following ranges. You can use the following formula to compute $BMI = \text{weight (kgs)} / \text{Height (Mts)}^2$

	BMI
Starvation	< 15
Anorexic	15.1 to 17.5
Underweight	17.6 to 18.5
Ideal	18.6 to 24.9
Overweight	25 to 25.9
Obese	30 to 39.9
Morbidity Obese	40.0 above

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

```
int main () {
```

```
    float weight, height, bmi;
```

```
    printf("Enter weight in Kilogram: ");
```

```
    scanf("%f", &weight);
```

```
    printf("Enter height in meters: ");
```

```
    scanf("%f", &height);
```

```
    if (weight <= 0 || height <= 0) {
```

```
        printf("Invalid Input! weight and height must  
        be greater than zero. \n");
```

```
    return 1;
}

bmi = weight / (height * height);

printf ("Your bmi is : %.2f \n", bmi);

if (bmi < 15.0) {
    printf ("Category : Starvation \n");
} else if (bmi >= 15.1 && bmi <= 17.5) {
    printf ("Category : Anorexic \n");
} else if (bmi >= 17.6 && bmi <= 18.5) {
    printf ("Category : Underweight \n");
} else if (bmi >= 18.6 && bmi <= 24.9) {
    printf ("Category : Ideal \n");
} else if (bmi >= 25.0 && bmi <= 25.9) {
    printf ("Category : Overweight \n");
} else if (bmi >= 30.0 && bmi <= 39.9) {
    printf ("Category : Obese \n");
} else if (bmi >= 40.0) {
    printf ("Category : Morbidly Obese \n");
} else {
    printf ("bmi does not match any known category. \n");
}

return 0;
}
```


Output : Enter weight in kilogram : 65
Enter height in meters : 1.68
Your BMI is : 23.03
Category : Ideal

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Compute BMI index x

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Output

Clear

```
1 #include <stdio.h>
2 int main() {
3     float weight, height, bmi;
4     printf("Enter your weight in kilograms: ");
5     scanf("%f", &weight);
6
7     printf("Enter your height in meters: ");
8     scanf("%f", &height);
9
10    bmi = weight / (height * height);
11    printf("\nYour BMI is: %.2f\n", bmi);
12    if (bmi < 15) {
13        printf("Category: Starvation\n");
14    } else if (bmi >= 15.1 && bmi <= 17.5) {
15        printf("Category: Anorexic\n");
16    } else if (bmi >= 17.6 && bmi <= 18.5) {
17        printf("Category: Underweight\n");
18    } else if (bmi >= 18.6 && bmi <= 24.9) {
19        printf("Category: Ideal\n");
20    } else if (bmi >= 25.0 && bmi <= 25.9) {
21        printf("Category: Overweight\n");
22    } else if (bmi >= 30.0 && bmi <= 39.9) {
23        printf("Category: Obese\n");
24    } else if (bmi >= 40.0) {
25        printf("Category: Morbidly Obese\n");
26    } else {
27        printf("Category: Undefined\n");
28    }
29    return 0;
30 }
```

Enter your weight in kilograms: 65

Enter your height in meters: 1.68

Your BMI is: 23.03

Category: Ideal

=== Code Execution Successful ===

3). WAP to check if three points (x_1, y_1) , (x_2, y_2) , and (x_3, y_3) are collinear or not.

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

```
int main ( ) {
```

```
    float x1, y1, x2, y2, x3, y3;
```

```
    float area;
```

```
    printf ("Enter coordinates of point 1 (x1 y1): ");  
    scanf ("%f %f", &x1, &y1);
```

```
    printf ("Enter coordinates of point 2 (x2 y2): ");  
    scanf ("%f %f", &x2, &y2);
```

```
    printf ("Enter coordinates of point 3 (x3 y3): ");  
    scanf ("%f %f", &x3, &y3);
```

```
    area = 0.5 * (x1*(y2-y3) + x2*(y3-y1) + x3*(y1-y2));
```

```
    if (area == 0.0) {
```

```
        printf ("The points are collinear. \n");
```

```
    } else {
```

```
        printf ("The points are not collinear. \n");
```

```
    }
```

```
    return 0;
```

```
}
```


Output : Enter the coordinates of point 1 (x_1, y_1):
3 4

Enter the coordinates of point 2 (x_2, y_2):
5 6

Enter the coordinates of point 3 (x_3, y_3):
7 8

The points are collinear.

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1

#include <stdio.h>

2

3

int main() {

4

float x1, y1, x2, y2, x3, y3;

5

float area;

6

7

printf("Enter coordinates of the first point (x1 y1): ");

8

scanf("%f %f", &x1, &y1);

9

10

printf("Enter coordinates of the second point (x2 y2): ");

11

scanf("%f %f", &x2, &y2);

12

13

printf("Enter coordinates of the third point (x3 y3): ");

14

scanf("%f %f", &x3, &y3);

15

16

area = 0.5 * (x1*(y2 - y3) + x2*(y3 - y1) + x3*(y1 - y2));

17

18

if (area == 0) {

19

printf("\nThe points are collinear.\n");

20

} else {

21

printf("\nThe points are NOT collinear.\n");

22

}

23

24

return 0;

25

}

Output

Clear

Enter coordinates of the first point (x1 y1): 3 4

Enter coordinates of the second point (x2 y2): 5 6

Enter coordinates of the third point (x3 y3): 7 8

The points are collinear.

=== Code Execution Successful ===

4) According to the gregorian calendar, it was Monday on the date 01/01/01. If any year is input through the keyboard write a program to find out what is the day on 1st January of this year.

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

```
int isleapyear (int year) {
    if ((year % 4 == 0 && year % 100 != 0) ||
        (year % 400 == 0))
```

```
    return 1;
```

```
else
```

```
    return 0;
```

```
}
```

```
int main () {
```

```
    int year, i, total-days = 0, day;
```

```
    char * days [] = {
```

```
        "Monday", "Tuesday", "Wednesday", "Thursday",
        "Friday", "Saturday", "Sunday"
```

```
};
```

```
printf ("Enter the year: ");
```

```
scanf ("%d", &year);
```

```
for (i=1; i < year; i++) {
```

```
    if (isleapyear(i))
```



```
total - days += 366 ;  
else  
total - days += 365 ;  
}  
  
day = total - days % 7 ;  
  
printf ("1st January of year %d is a %s. \n",  
        year, days [day]) ;  
  
return 0 ;  
}
```

Output : Enter the year : 2025
1st January of year 2025 is a
Wednesday.

main.c	Output
<pre>1 #include <stdio.h> 2 3 int isLeapYear(int year) { 4 if ((year % 4 == 0 && year % 100 != 0) (year % 400 == 0)) 5 return 1; 6 else 7 return 0; 8 } 9 10 int main() { 11 int year, i, totalDays = 0; 12 char *days[] = {"Monday", "Tuesday", "Wednesday", "Thursday", "Friday", 13 "Saturday", "Sunday"}; 14 15 printf("Enter the year: "); 16 scanf("%d", &year); 17 18 for (i = 1; i < year; i++) { 19 if (isLeapYear(i)) 20 totalDays += 366; 21 else 22 totalDays += 365; 23 } 24 25 int dayIndex = totalDays % 7; 26 27 printf("1st January %d is a %s\n", year, days[dayIndex]); 28 29 return 0; 30 }</pre>	<p>Enter the year: 2025 1st January 2025 is a Wednesday</p> <p>=== Code Execution Successful ===</p>

- 5) WAP using ternary operator, the user should input the length and breadth of a rectangle, one has to find out which rectangle has the highest perimeter. The minimum number of rectangles should be three.

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

```
int main () {
```

```
    int l1, b1, l2, b2, l3, b3;
```

```
    int p1, p2, p3;
```

```
    int maxPerimeter;
```

```
    int maxRect;
```

```
    printf("Enter length and breadth of rectangle 1: ");  
    scanf("%d %d", &l1, &b1);
```

```
    printf("Enter length and breadth of rectangle 2: ");  
    scanf("%d %d", &l2, &b2);
```

```
    printf("Enter length and breadth of rectangle 3: ");  
    scanf("%d %d", &l3, &b3);
```

```
    p1 = 2 * (l1 + b1);
```

```
    p2 = 2 * (l2 + b2);
```

```
    p3 = 2 * (l3 + b3);
```

```
    maxPerimeter = (p1 > p2) ? ((p1 > p3) ? p1 : p3) :  
                    ((p2 > p3) ? p2 : p3);
```

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$$\text{maxRectangle} = (p_1 > p_2) ? ((p_1 > p_3) ? 1 : 3) : ((p_2 > p_3) ? 2 : 3);$$

```
printf (" %d Rectangle %d has the highest perimeter:  
%d %d", maxRectangle, maxPerimeter);
```

~~return 0;~~

Output : Enter length and breadth of rectangle :
3 20

3 20

Enter length and breadth of rectangle 2 :
5 15

50 15

Enter length and breadth of rectangle 3 :
7 13

7 13

Rectangle 1 has the highest perimeter: 46

main.c	Output
<pre> 1 #include <stdio.h> 2 int main() { 3 int l1, b1, l2, b2, l3, b3; 4 int p1, p2, p3; 5 int maxPerimeter; 6 int maxRect; 7 8 printf("Enter length and breadth of Rectangle 1: "); 9 scanf("%d %d", &l1, &b1); 10 11 printf("Enter length and breadth of Rectangle 2: "); 12 scanf("%d %d", &l2, &b2); 13 14 printf("Enter length and breadth of Rectangle 3: "); 15 scanf("%d %d", &l3, &b3); 16 17 p1 = 2 * (l1 + b1); 18 p2 = 2 * (l2 + b2); 19 p3 = 2 * (l3 + b3); 20 maxPerimeter = (p1 > p2) 21 ? ((p1 > p3) ? p1 : p3) 22 : ((p2 > p3) ? p2 : p3); 23 24 maxRect = (p1 > p2) 25 ? ((p1 > p3) ? 1 : 3) 26 : ((p2 > p3) ? 2 : 3); 27 28 printf("Rectangle %d has the highest perimeter: %d\n", maxRect, maxPerimeter); 29 return 0; 30 }</pre>	<pre> Enter length and breadth of Rectangle 1: 3 20 Enter length and breadth of Rectangle 2: 5 15 Enter length and breadth of Rectangle 3: 7 13 Rectangle 1 has the highest perimeter: 46 === Code Execution Successful ===</pre>