

Name: Patel Anuragkumar Sureshbhai
Branch: Civil
Division: 2-(D-4) Roll no: 25BCL 106

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→ Section-A: Programs Using If condition.

1. find the largest and smallest of two values:

```
#include <stdio.h>
int main() {
    int a, b;
    printf("Enter two no.: ");
    scanf("%d %d", &a, &b);
    if (a > b) {
        printf("Largest no. is = %d\n", a);
        printf("Smallest no. is = %d\n", b);
    } else if (b > a) {
        printf("Largest no. is = %d\n", b);
        printf("Smallest no. is = %d\n", a);
    } else {
        printf("Both nos. are equal : %d\n", a);
    }
    return 0;
}
```

(1) Output:-

Enter two num: 5 4

Largest number = 5

Smallest number = 4

2. find the largest and smallest of three values.

```
#include <stdio.h>
int main() {
    int a, b, c, largest, smallest;
    printf ("Enter three no. : ");
    scanf ("%d %d %d", &a, &b, &c);
    if (a>=b && a>=c) {
        largest = a;
    } else if (b>=a && b>=c) {
        largest = b;
    } else if (c>=b && c>=a) {
        largest = c;
    }
}
```

}

if (a <= b && a <= c) {

Smallest = a;

} else if (b <= a && b <= c) {

Smallest = b;

} else if (c <= a && c <= b) {

Smallest = c;

}

printf ("Largest no.: %d\n", largest);

printf ("Smallest no.: %d\n", smallest);

return 0;

} /* If a <= b & b <= c then largest = c */

(2) Output:

Enter three numbers : 4 6 7

Largest number = 7

Smallest number = 4

3.

Calculate net salary where:

Net Salary = Gross Salary + Allowances - Deductions

Conditions:

- If Gross salary > 1000 : Allowance = 10%, Deduction = 3%
- If Gross salary > 5000 : Allowance = 7%, Deduction = 2%

#include <stdio.h>

int main () {

float gross, allowance, deduction, net;

printf ("Enter Gross Salary: ");

scanf ("%f", &gross);

if (gross > 1000) {

allowance = 0.10 * gross;

deduction = 0.03 * gross;

}

else if (gross > 5000) {

allowance = 0.07 * gross;

deduction = 0.02 * gross;

} else {

allowance = 0;

deduction = 0;

}

(3) output:-

Enter Gross Salary = 40000

Net Salary = 42800

net = gross + allowance - deduction;
printf ("Net salary = %.2f\n", net);
return 0; }

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4. Check if a number is divisible by 7 or not:-

#include <stdio.h>

int main() {

int num;

printf ("Enter a number: ");

scanf ("%d", &num);

if (num % 7 == 0) {

printf ("%d is divisible by 7.\n", num);

} else {

printf ("%d is not divisible by 7.\n", num);

}

return 0;

}

(4)

Output:

Enter a number : 36

36 is Not divisible (by 7. $\Rightarrow i \neq 1$)

⇒ Section B : Programs using Loops:-

Program: Print first n Natural Numbers
(Using for Loop):

1. Print first 10 natural numbers:-

```
#include <stdio.h>
int main() {
    int i;
    printf ("first 10 natural numbers are: \n");
    for (i=1; i<=10; i++)
        printf ("%d\n", i);
    return 0;
}
```

Sec. 8 :- B

(1)

Output :-

first 10 natural numbers are :-

1

2

3

4

5

6

7

8

9

10

2. Print first 10 odd numbers

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

```
int main() {
```

```
    int i;
```

```
    printf ("First 10 odd numbers are:\n");
```

```
    for (i=1; i<=20; i=i+2) {
```

```
        printf ("%d\n", i);
```

```
}
```

```
return 0;
```

```
}
```

(2) Output:-

First 10 odd numbers are:-

1

3

5

7

9

11

13

15

17

19

Output (2)

1

3

5

7

9

11

13

15

17

19

Output (2)

3. Print first 10 even numbers:-

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

```
int main () {
```

```
    int i;
```

```
    printf ("first 10 even numbers are: \n");
```

```
    for (i=2; i<=20; i=i+2) {
```

```
        printf ("%d\n", i);
```

```
}
```

```
return 0;
```

```
}
```

(3) Output:-

first 10 even numbers are:-

2

4

6

8

10

12

14

16

18

20

4. Print first n natural numbers.

```
#include <stdio.h>

int main () {
    int n, i, count=0;
    printf ("Enter the value of n: ");
    scanf ("%d\n", &n);
    printf ("First %d natural numbers are: \n", n);
    i = 1;
    while (count < n) {
        printf ("%d\n", i);
        i++;
        count++;
    }
}
```

(4) Output:-

Enter a number (n): 5

first 5 natural numbers are:

1 2 3 4 5

```
return 0;
```

```
}
```

5. Print first n odd numbers:-

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

```
int main(){
```

```
    int n, i, count = 0;
```

```
    printf ("Enter the value of n: ");
```

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

```
    printf ("First %d odd numbers are:\n", n);
```

```
i=1;
```

```
while (count < n){
```

```
    printf ("%d\n", i);
```

```
    i = i + 2;
```

```
    count++;
```

```
}
```

```
return 0;
```

```
}
```

(5)

Output:-

First 6 odd numbers are :-

Enter a number (n); 4 \Rightarrow first 4 odd numbers are

1

3

5

7

9

11

13

15

17

```
return 0; } // random int strg() function
```

```
}
```

```
if(strg == "b") func
```

```
i(s=i+2); s=3; i=i+1; n)
```

6. Print first n even numbers: { 20 marks}

```
#include <stdio.h> // be b4 func for main() function
```

```
int main() {
```

```
int n, i, count = 0;
```

```
printf("Enter the value of n: ");
```

```
scanf("%d", &n); // n func to max first n
```

```
printf("First %d even numbers are: \n", n);
```

```
i=2;
```

```
while(count < n) {
```

```
printf("%d \n", i);
```

```
i = i+2;
```

```
Count ++;
```

```
Y
```

```
return 0; // max number b4 func to max() function
```

```
Y
```

(6)

Output:-

Enter the value of n: 5

First 5 even numbers are:

2

4

6

8

10

7. Print sum of n natural numbers.

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

```
int main()
```

```
int n, sum;
```

```
printf ("Enter a number : ");
```

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

```
sum = ((n * (n + 1)) / 2);
```

```
printf ("Sum of the first %d natural numbers is %d",
```

```
return 0;
```

```
}
```

(7)

Output:-

Enter a number : 5

sum of the first 5 is 15

8. Print sum of first n odd numbers.

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

```
int main() {
```

```
    int n, sum = 0;
```

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

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

```
    for (int i=1, i<=2*n; i+=2) {
```

```
        sum += i; }
```

```
    printf("sum of first %d odd numbers = %d\n", n, sum);
```

```
    return 0;
```

```
}
```

(b)

Output:

Enter a number : 5

sum of the first 5 odd number is 25

9. Print sum of first n even numbers:

```
#include <stdio.h>
int main() {
    int n, sum = 0;
    printf("Enter the number:");
    scanf("%d", &n);
    for (int i=2; i<=2*n; i+=2) {
        sum += i;
    }
    printf("Sum of first %d even numbers = %d\n", n, sum);
    return 0;
}
```

(g) Output:-

Enter a number : 5
Sum of the first 5 even numbers is 80

10. Print factorial of a number. (e.g. $5! = 120$)

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

```
int main () {
```

```
int n, sum = 1;
```

```
printf ("Enter the number!");
```

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

```
for (int i=1 ; i<=n ; i++) {
```

```
sum = sum * i;
```

```
}
```

```
printf ("Factorial %d = %d\n", n, sum);
```

```
return 0;
```

```
}
```

(10) Output:-

Enter the number: 5

factorial 5 = 120

11. Print your name 5 times:

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

```
int main() {
```

```
    int i, n;
```

```
    char name[50];
```

```
    printf ("Enter your name : ");
```

```
    scanf ("%s", name);
```

```
    printf ("Enter
```

```
    for (i=1 ; i<=5 ; i++) {
```

```
        printf ("%s\n", name);
```

```
}
```

```
return 0;
```

```
}
```

(11)

Output:-

Enter your name : Anurag

your name 5 times prints:

Anurag

Anurag

Anurag

Anurag

Anurag

12. Print your name n times in 10 to 10 minutes first of
#include <stdio.h>
int main () {
 int n, i;
 char name [50];
 printf ("Enter your name : ");
 scanf ("%s", name);
 printf ("Enter your name how many times to print your
name : ");
 scanf ("%d", &n);
 for (i=1; i<=n; i++) {
 printf ("%s\n", name);
 }
 return 0;
}

(12)

Output:-

Enter your name : Anurag

Enter how many times to print your name : 4

Your name 4 times:

Anurag

Anurag

Anurag

Anurag

Q. Print sum of numbers divisible by 13 from 1 to 100.

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

```
int main () {  
    int i, sum=0;  
    for (i=1; i<=100; i++) {  
        if (i%13 == 0) {  
            sum = sum+i;  
        }  
    }
```

```
    printf ("The sum of numbers divisible by 13 from 1 to  
    100 is %d\n", sum);
```

```
    return 0;  
}
```

(15)

Output:

The sum of numbers divisible by 18 from
1 to 100 is = 364

14. Calculate sum and mean of 10 values.

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

```
int main() {
```

```
int i, num;
```

```
int sum = 0;
```

```
float mean;
```

```
printf ("Enter 10 values : \n");
```

```
for (i = 1; i <= 10; i++) {
```

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

```
sum = sum + num;
```

```
}
```

```
mean = sum / 10.0;
```

```
printf ("Sum = %d\n", sum);
```

```
printf ("Mean = %.2f\n", mean);
```

```
return 0;
```

```
}
```

(ii)

Output:-

Enter 10 values:-

1 2 3 4 5 6 7 8 9 10

Sum = 55

mean = 5.50

15. Calculate sum and mean of n values:-

```
#include <stdio.h>
int main() {
    int i, n;
    float sum = 0;
    float mean;
    printf ("Enter the number of value: ");
    scanf ("%d", &n);
    float value [n];
    printf ("Enter .d value : %n", n);
    for (i=0 ; i<n ; i++) {
        scanf ("%f", &value [i]);
        sum += value [i];
    }
    mean = sum / n;
    printf ("sum = %.2f \n", sum);
```

```
printf ("mean = %.2f\n", mean);  
return 0;  
}
```

(15) Output:

Enter the number of value : 3

Enter 3 value:

4 5 6

sum = 15

mean: 5

16. Find the largest and smallest among 100 numbers

```
#include <stdio.h>
int main() {
    int num, i, largest, smallest;
    printf("Enter 100 numbers : \n");
    largest = smallest = num;
    for (i=1; i<100; i++) {
        scanf("%d", &num);
        if (num > largest)
            largest = num;
        if (num < smallest)
            smallest = num;
    }
    printf("Largest number = %d\n", largest);
    return 0;
}
```

(16) Output:-

Enter 100 numbers:-

5 7, 29 16 ... (total 100 numbers)

Largest number = 54326172

Smallest number = 5

17. Count positive, negative, and zero numbers among 200 values.

```
#include <stdio.h>
int main() {
    int i, num;
    int positive = 0, negative = 0, zero = 0;
    printf("Enter 200 numbers:\n");
    for (i=1; i<=200; i++) {
        scanf("%d", &num);
        if (num > 0) {
            positive++;
        } else if (num == 0) {
            zero++;
        } else {
            negative++;
        }
    }
}
```

else if (num < 0) {

 negative = negative + 1;

} else {

 zero = zero + 1;

}

y

y

(19)

Output:-

5 -3 0 9 -1 0 7 ... (200 numbers total).

positive numbers = 190

negative numbers = 5

zeros = 5

18. Count number of boys and girls in a class of
50 students using sex code

```
#include <stdio.h>
int main() {
    int i, code;
    int boys = 0, girls = 0;
    printf("Enter sex code for 50 students (1 for Boy, 2 for Girl):\n");
    for (i = 1; i <= 50; i++) {
        scanf("%d", &code);
        if (code == 1) {
            boys = boys + 1;
        } else if (code == 2) {
            girls = girls + 1;
        } else {
            printf("Invalid code! Use 1 for Boy or 2 for Girl.\n");
            i--;
        }
    }
    printf("Total Boys : %d\n", boys);
    printf("Total Girls : %d\n", girls);
    return 0;
}
```

(18)

Output:

18 11 22 1... (50 values) bright

Total boys = 40

Total Girls = 10

19. Print numbers from 1 to 100 divisible by 5.

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

```
int main () {
```

```
    int i;
```

```
    printf ("Numbers from 1 to 100 divisible by 5 are
```

```
    for (i=1; i<=100; i++) {
```

```
        if (i%5 == 0) {
```

```
            printf ("%d\n", i);
```

```
}
```

```
return 0;
```

```
}
```

(19) Output:

Numbers from 1 to 100 divisible by 5 are:

5

10

15

20

25

30

⋮

100

20. Print sum of all numbers from 1 to 100 divisible by 3

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

```
int main () {  
    int i, sum = 0;  
    for (i=1; i<=100; i++) {  
        if (i%3 == 0) {  
            sum += i;  
        }  
    }  
}
```

```
printf ("Sum of numbers from 1 to 100 divisible  
by 3 is : %d\n", sum);
```

```
return 0
```

```
}
```

(20)

Output:

Numbers from 1 to 100 divisible by 3:

3 6 9 12 15 18 21 24 27 30 33 36 39

42 45 48 51 54 57 60 63 66 69 72 75

78 81 84 87 90 93 96 99

21. Separate digits of a given number (e.g. 351 - 1, 5, 3).

#include <stdio.h>

```
int main() {  
    int num, digit;  
    printf ("Enter a num.: ");  
    scanf ("%d", &num);  
    printf ("Digits are: \n");  
    while (num > 0) {  
        digit = num % 10;  
        printf ("%d\n", digit);  
        num = num / 10  
    }  
    return 0;  
}
```

(21)

E S I : medium o output
Output: medium generate no 17 at

Enter a number: 350

Digits of 350 are = 3 5 0

22. Count digits in a given numbers. (e.g. 357 → 3).

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

```
int main () {  
    int num, count = 0;  
    printf ("Enter a number: ");  
    scanf ("%d", &num);  
    if (num == 0) {  
        count = 1;  
    } else {  
        while (num != 0) {  
            num = num / 10;  
            count = count + 1;  
        }  
        printf ("Total digits = %d\n", count);  
    }  
    return 0;  
}
```

(22)

Output:

Enter a number : 350

Number of a digit = 3

23. Sum of digits of a given number (eg. 251 → 9).

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

```
int main() {
```

```
    int num, digit, sum = 0;
```

```
    printf ("Enter a number: ");
```

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

```
    if (num < 0) {
```

```
        num = -num;
```

```
}
```

```
    while (num > 0) {
```

```
        digit = num % 10;
```

```
        sum = sum + digit;
```

```
        num = num / 10;
```

```
}
```

```
    printf ("Sum of digits = %d\n", sum);
```

```
    return 0;
```

```
}
```

(23) Output:

Enter ci number : 350

Sum of ci digits : 8

24. Reverse the digits of a number (e.g. 357 → 753)

#include <stdio.h>

```
int main () {  
    int num , digit, reverse = 0;  
    printf ("Enter a number : ");  
    scanf ("%d" & num);  
    while (num != 0) {  
        digit = num % 10;  
        reverse = reverse * 10 + digit;  
        num = num / 10;  
    }
```

```
    printf ("Reversed number = %d\n", reverse);  
    return 0 ;
```

}

(8a) Output:

Enter a number = 350

Digits in a reverse order : 0 5 3

25. check whether a number is palindrome (e.g., 12321).
include <stdio.h>

```
int main () {  
    int num, original, digit, reverse = 0;  
    printf ("Enter a number: ");  
    scanf ("%d", &num);  
    original = num;  
    while (num != 0) {  
        digit = num % 10;  
        reverse = reverse * 10 + digit;  
        num = num / 10;  
    }  
    if (original == reverse) {  
        printf ("number is a palindrome.\n");  
    } else {  
        printf ("Number is not a palindrome.\n");  
    }  
    return 0;  
}
```

(25)

Output:-

Enter a number : 1356

1356 is a Palindrome number

27. Print all factors of a number } (e.g. 6 → 1, 2, 3, 6.)

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

```
int main() {
```

```
    int n, sum = 1;
```

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

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

```
    for (int i=1; i<=n; i++) {
```

```
        sum = sum * i;
```

```
}
```

```
    printf ("Factorial %d is %d\n", n, sum);
```

```
    return 0;
```

```
}
```

(28)

Output :-

Enter a number : 6

6 is a Perfect Number

Q28.. Check whether a number is a perfect number (e.g. 6).

```
#include <stdio.h>
int main() {
    int num, i, sum = 0;
    printf ("Enter a number: ");
    scanf ("%d", &num);
    for (i=1; i<=num/2; i++) {
        if (num % i == 0) {
            sum += i;
        }
    }
    if (sum == num && num != 0) {
        printf ("%d is a perfect no.\n", num);
    } else {
        printf ("%d is not perfect no.\n", num);
    }
    return 0;
}
```

(28)

Output:-

Enter a number : 6

6 is a Perfect Number

29. Check whether a number is a prime number.

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

```
int main() {  
    int num, i, flag = 0;  
    printf ("Enter a number : ");  
    scanf ("%d", &num);  
    if (num <= 1) {  
        printf ("%d is not a prime number", num);  
        return 0;  
    }  
    for (i = 2; i <= num/2; i++) {  
        if (num % i == 0) {  
            flag = 1;  
            break;  
        }  
    }  
}
```

(29)

Output:-

Enter a number : 50

50 is Not a prime numbers.

```
    return 0;  
}
```

30. Print all prime numbers between 1 and 500.

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

```
int i, j, flag;  
printf ("Prime numbers between 1 and 500 are:\n");  
for (i = 2 ; i <= 500 ; i++) {  
    flag = 0;  
    for (j = 2 ; j <= i/2 ; j++) {  
        if (i % j == 0) {  
            flag = 1;  
            break;  
        }  
    }  
    if (flag == 0) {  
        printf ("%d\n", i);  
    }  
}  
return 0;
```

31. find summation of prime numbers between

81. find summation of prime numbers between 1 and 500.

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

```
int i, j, flag;
```

```
int sum = 0;
```

```
for (i = 2; i <= 500; i++) {
```

```
    flag = 0;
```

```
    for (j = 2; j <= i/2; j++) {
```

```
        if ((i % j) == 0) {
```

```
            flag = 1;
```

```
            break;
```

```
}
```

```
}
```

```
point f (sum = sum + i);
```

```
return 0;
```

82. Count how many prime numbers are there

between 1 and 500.

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

```
int main () {
```

```
int i, j, flag;
```

```
printf (" Prime numbers between 1 and 500 are: \n");
```

```
for (i=2; i <= 500; i++) {
```

```
flag = 0;
```

```
for (j=2; j <= i/2; j++) {
```

```
if (i % j == 0) {
```

```
flag = 1;
```

```
break;
```

```
}
```

```
}
```

```
if (flag == 0) {
```

```
printf ("%d\n", i);
```

```
,
```

```
}
```

```
return 0;
```

```
,
```

(31)

Output:-

summation of prime numbers between
1 to 500 = 21536.

33. Check whether a number is an automorphic number (eg $25 \rightarrow 625$):

#include <stdio.h>

int main() {

int n, i;

int t = 0; // t = 2 = 1. next term

int num, square, temp, digits = 0, last, i, power = 1;

printf("Enter a number : ");

scanf("%d", &num);

Square = num * num;

temp = num;

while (temp != 0) {

 digits++;

 temp = temp / 10;

}

for (i = 1; i <= digits; i++) {

 power = power * 10;

}

last = square % power;

if (last == num) {

 printf("%d is an Automorphic Number.\n", num);

} else {

 printf("%d is NOT an Automorphic number.\n", num);

}

return 0;

}

(23)

Output:-

Enter a number: 25

25 is an automorphic number.

34. Print fibonacci series up to n terms.

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

```
int main () {
```

```
    int n, i;
```

```
    int f1 = 0, f2 = 1, nextTerm;
```

```
    printf ("Enter the number of terms: ");
```

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

```
    printf ("fibonacci series up to %d terms: %n", n);
```

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

```
        printf ("%d\n", f1);
```

```
        nextTerm = f1 + f2;
```

```
        f1 = f2;
```

```
        f2 = nextTerm;
```

```
}
```

{
 i++
}

```
    return 0;
```

```
}
```

{
 i++
}

(34) Output:-

Enter a number of term: 5
Fibonacci Series up to terms: 0 1 1 2 3

⇒ Section C : Pattern Programs (Loop within Loop);

Pattern 1: Increasing Triangle Pattern: (A)

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

```
int main() {
```

```
    int i, j;
```

```
    for (i = 1; i <= 2; i++) {
```

```
        for (j = 1; j <= 3; j++) {
```

```
            printf ("%d %d\n", i, j);
```

```
}
```

```
}
```

```
return 0;
```

```
}
```

Output:-

1 1

1 2

1 3

2 1

2 2

2 3

Pattern 2:-(B)

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

```
int main() {
```

```
    int i, j;
```

```
    for (i = 1; i <= 3; i++) {
```

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

```
            printf ("%d %d\n", i, j);
```

```
}
```

```
}
```

```
return 0;
```

```
}
```

Output:-

1 1

2 2

3 1

3 2

3 3

Pattern1(c)

```
#include <stdio.h>
int main () {
    int i, j, k;
    for (i = 1; i <= 2; i++) {
        for (j = 1; j <= 2; j++) {
            for (k = 1; k <= 2; k++) {
                printf ("%d %d %d\n", i, j, k);
            }
        }
    }
    return 0;
}
```

Output:-

1 1 1

1 1 2

1 2 1

1 2 2

2 1 1

2 1 2

2 2 1

2 2 2

Pattern1(D):-

```
#include <stdio.h>
int main () {
    int i, j;
    for (i = 5; i >= 3; i--) {
        for (j = 1; j <= 2; j++) {
            printf ("%d %d\n", i, j);
        }
    }
    return 0;
}
```

Output:-

5	1
5	2
4	1
4	2
3	1
3	2

⇒ Pattern 2 (A):

```
#include <stdio.h>
int main () {
    int i, j;
    j = 5;
    for (i = 1; j <= 5; i++) {
        printf ("%d %d\n", i, j);
        j--;
    }
    return 0;
}
```

Output: (1)

1 5

2 4

3 3

4 2

5 1

⇒ Pattern 2 (B):

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

```
int main () {
```

```
    int i, j, k;
```

```
    j = 5;
```

```
    for (i = 1; i <= 3; i++) {
```

```
        for (int k = 1; j <= 2; j++, k++) {
```

```
            printf ("%d %d\n", i, j);
```

```
        }
```

```
        j--;
```

```
}
```

```
return 0;
```

```
}
```

Output: (1)

1 5

2 5

3 5

4 5

5 5

6 5

7 5

8 5

9 5

10 5

11 5

12 5

13 5

14 5

15 5

16 5

17 5

18 5

19 5

20 5

21 5

22 5

23 5