

## Chapter-06

### programming Exercise

16.1 Given a number, write a program using while loop to reverse the digits of the number.

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

```
int main () {
```

```
    int n;
```

```
    printf ("enter number \n");
```

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

```
    printf ("reverse of number %d is : ", n);
```

```
    while (n != 0) {
```

```
        printf ("%d", n % 10);
```

```
        n = n / 10; }
```

```
    printf ("\n");
```

```
}
```

Output :

Enter Number

123

reverse of number 321

16.2 Find a factorial of given number.

```
#include <stdio.h>
int main() {
    int n, fact=1, temp;
    temp=n;
    printf("enter your number \n");
    scanf("%d", &n);
    while (n!=1) {
        fact=fact*n;
        n--;
    }
    printf("factorial %d is %d\n", temp, fact);
    return 0;
}
```

Output: enter your number

3  
factorial 3 is 3\*2\*1

16.3 Write a program to compute the sum of the digits of a given number.

```
#include <stdio.h>
void main() {
    int n, digit, sum=0, temp;
    printf("enter your number \n");
    scanf("%d", &n);
    temp=n;
    while (temp!=0) {
        digit=temp%10;
        sum+=digit;
        temp/=10;
    }
    printf("sum of digits is %d", sum);
}
```

Q.3

```
while (n!=0){
```

```
    digit = n%10;
```

```
    Sum = Sum + digit;
```

```
    n = n/10; }
```

```
- printf ("Sum of all digit %d is %d\n", temp, Sum);
```

```
}
```

Output:

enter your number

3 4 3

Sum of all digit 343 is @ 10

Q.4 write a program to print this 1123581321...n.

This series until n.

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

```
int main()
```

```
{ int i, n, Prev-term=0, Next-term=1, next-term, Sum=0;
```

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

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

```
printf ("Fibonacci Series is till %d : ", n);
```

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

```
    Sum = Sum + Prev-term;
```

```
    printf ("%d ", Prev-term);
```

next-term = Prev-term + rece-term;

Prev-term = rece-term;

rece-term = next-term; } E & L

printf ("\n Sum of all Series is : %d\n", sum); P.P. w/ E&L to work

return 0; Preferred with output of modifying a variable

}

Output: Enter the number of terms: 4 but still

Fibonacci Series is till 4: 0 1 1 2 abnormal

Sum of this Series : 4 3 (normal)

**6.5** A reversing number using for loop.

#include <stdio.h>

int main () {

int i, n;

printf ("enter your number to receive \n");

scanf ("%d", &n);

printf ("reverse of %d is, " n);

for (i=0, n=0; i<=n; i++) {

printf ("%d", n%10);

n = n/10; }

return 0;

}

Output:

enter your number to receive

123

reverse of 123 is 321

6.6

Write a program to evaluate the following investment equation

```
#include <stdio.h>
#include <math.h>
int main() {
    int i, n, P, J;
    double r, t;
    printf("\n\n\n");
    r = 0.10;
    n = 10;
    P = 1000;
    t = pow((1+r), i);
    printf("\n P R N V\n.");
    for (i=1; i<=n; i++) {
        if (r<=0.20 && P<=10000) {
            t = pow((1+r), i);
            V = P*t;
```

```

P=P+1000;
R=R+0.01;
printf ("%d %d %d", P, R, n);
printf ("V=%d", V);
printf ("\n");
}
return 0;
}

```

Output:

P	R	N	V
2000	0.110000	10	V=1100.00000
3000	0.120000	10	V=2464.20000
4000	0.130000	10	V=4214.784000
5000	0.140000	10	V=6521.894400

**6.7**

a) Pyramid printing:

```

#include <stdio.h>
int main() {
    int i, j;
    for (i=1; i<=5; i++) {
        for (j=1; j<=i; j++) {
            // code for printing pyramid
        }
    }
}

```

```

    printf("%d", i);
    printf("\n");
    return 0;
}

```

Output:

```

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

```

b)

```

#include <stdio.h>
void main(){
    int i, j, k;
    int n = 6;
    for (i = 1; i <= n; i++) {
        for (j = 1; j <= i; j++) {
            printf(" ");
        }
        for (k = 1; k <= n; k++) {
            printf("*");
        }
        printf("\n");
        n--;
    }
    return 0;
}

```

Output:

```

*****
 * *
 * *
 * *
 * *
 * *
 * *

```

Q6.8 Write a program to read the age of 100 persons and Count the number of persons in the age 50 to 60.

Answer: #include <stdio.h>

```
void main () {  
    int i, age, count = 0;  
    printf ("Enter age of 100 people");  
    for (i=1; i<=10; i++) {  
        scanf ("%d", &age);  
        if (age >= 50 && age <= 60)  
        {  
            count++;  
            continue;  
        }  
        printf ("%d people in age 50-60 group %d", count);  
        return;  
}
```

Output: Enter age of 100 people

12

57

52

67

55

75

58

40

{

4 people in age of 50 to 60 group

Q6.9

Write the program of case study 6.4 using else... if

```
#include <stdio.h>
#include <math.h>
Void main () {
    int i;
    float a, x, y1, y2;
    a=0.4;
    printf ("1\nn");
    printf (".....\n");
    printf ("0---\n");
    for (x=0; x<5; x+=0.25) {
        y1 = (int) (50 * exp(-a*x) + 0.5);
        y2 = (int) (50 * exp(-a*x*x/2) + 0.5);
        if (y1==y2) {
            if (x==2.5)
                printf ("x");
            else
                printf ("1");
        }
        for (i=1; i<=(y1-1); i++)
            printf (" ");
    }
}
```

```
printf("#\n"); }  
else if(y1 > y2) {  
    if(x == 2.5)  
        printf("x");  
    else  
        printf("/");  
    for(i=1; i<=(y2-1); ++i)  
        printf(" ");  
    printf("*");  
    for(i=1; i<=(y1-y2-1); ++i)  
        printf("-");  
    printf("0\n"); }  
else  
    printf("\n");  
    for(i=1; i<=(y1-1); ++i)  
        printf(" ");  
    printf("0");  
    for(i=1; i<=(y2-y1-1); ++i)  
        printf("-");  
    printf("*\n"); }  
    printf("\n");  
return 0;
```

J6.10

Write a program to print a table of values of the function  $y = \exp(-x)$  for  $x$  varying from 0.0 to 10.0. The table should appear as follows.

```
#include <stdio.h>
#include <math.h>
void main() {
    int i, j;
    float y;
    printf("In main ---\n");
    printf("%d\n");
    for (i=0; i<10; i++) {
        for (j=0; j<10; j++) {
            y = exp(-i);
            printf("% .2f", y);
            printf("\n");
        }
        return 0;
    }
}
```

6.11 write a program that will read a positive integer and determine and print its binary equivalent.

```
#include <stdio.h>
int main() {
    int arr[10], n, i=0;
    printf ("Enter your number (n)");
    scanf ("%d", &n);
    printf ("binary of %d is", n);
    while (n != 0) {
        arr[i] = n % 2;
        i++;
        n = n / 2;
    }
    for (i=i-1; i>=0; i--) {
        printf ("%d", arr[i]);
    }
    return 0;
}
```

Output: Enter your number

4      : 100

binary of 4 is: 100



Q6.13 Write a program to compute the value of Euler's number that is used as the base of natural logarithms.

```
#include <stdio.h>
float fact (float i) {
    float f = 1;
    int k;
    for (k=1; k<=i; k++)
        f *= k;
    return f;
}
void main() {
    float e, a, b, d=1, temp;
    int i, j, k;
    e = 1; i = 2; b = 1;
    while (d >= 0.00001) {
        temp = fact (i);
        a = 1 / temp;
        e = e + a;
        d = b - a;
        if (d <= 0.00001)
            b = a;
        i++;
    }
    printf ("\n\n The result = %f", e);
    return 0;
}
```

Output: the result = 1.718282 .

Q6.14 Write a program to evaluate the following functions to 0.0001% accuracy.

a) Sin x function.

```
#include <stdio.h>
#include <math.h>
double fact (double power) {
    double f = 1;
    int K;
    for (K=1; K<=power; K++)
        f = f * K;
    return f;
}
void main () {
    int i=1;
    double x, term, deno, lob, Sin, power = 3;
    printf ("angle Sin x = \n");
    scanf ("%lf", &x);
    term = x;
    Sin = x;
    while (term >= 0.0001) {
        lob = pow (x, power);
        deno = fact (power);
        term = lob / deno;
        if (i % 2 == 1)
            Sin = Sin - term;
        else
            Sin = Sin + term;
        i++;
    }
}
```

```
else  
Sin = Sin + term;  
i++ } }
```

```
printf (" the result = %0.2f ", Sin);
```

```
return 0;
```

```
}
```

Output: angle Sin x =   
30  
the result = 0.99

b) Cos x : #include <stdio.h>

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

```
double fact (double power) {
```

```
double f = 1;
```

```
int K;
```

```
for (K=1; K<=power; K++)
```

```
f = f*K;
```

```
return f;
```

```
Void main () {
```

```
int i=1;
```

```
double x, term, deno, lob, cos, power = 3;
```

```
printf ("angle cos x = (%d)", i);
```

```
Scarf ("%lf", &x);
```

```
term = x;
```

```
cos = x;
```

```

while (term >= 0.0001) {
    lob = pow (x, power);
    deno = fact (power);
    term = lob / deno;
    power += 2;
    if (i > 2 == 1)
        cos = cos - term;
    else
        cos = cos + term;
    i++;
}
printf ("the result = %f", cos);
return 0;
}

```

Output: angle .cos x =

30

the result = -0.99

- Q6.15 The present value of an item is given by the relationship  $P = C(1-d)^n$ . Write a program to compute the useful life in years given the original cost, depreciation rate, and the scrap value.

```

#include <stdio.h>
#include <math.h>
void main() {
    int c, n;
    double d, p, lob, horz;

```

```

printf("Input original cost, rate of depreciation, Present value");
scanf("%d %f %f", &c, &d, &p);
lob = log(p/c);
horz = log(1-d);
n = lob/horz;
printf("Year = %d", n);
return 0;
}

```

Output: Input original cost, rate of depreciation, present value.

$$\text{Year} = \frac{\ln(p/c)}{\ln(1-d)}$$

**Q6.16** Write a program to print a square of size 5 by using the character S as shown below.

```

a) #include <stdio.h>
#include <math.h>
void main() {
    int i, j;
    for (i=0; i<5; i++) {
        for (j=0; j<5; j++) {
            printf("S");
        }
        printf("\n");
    }
    return 0;
}

```

Output:

```
S S S S S  
S S S S S  
S S S S S  
S S S S S  
S S S S S
```

b)

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

Output:

S	S	S	S	S
S		S		
S		S		
S		S		
S	S	S	S	S

Q6.17 Write a program to graph the function,

$$y = \sin(x)$$

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

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

```
void main() {
```

```
float y;
```

```
int x, i;
```

```
printf("x Sin(x)\n");
```

```
for (i=0; i<=180; i+=15) {
```

```
x = i;
```

```
y = sin(x);
```

```
printf("%d %0.3f\n", x, y);}
```

```
return 0;
```

```
}
```

Output:

X	$\sin(x)$
0	0.000
180	-0.001

16.18

Write a program to print all the integers that are not divisible either by 2 or 3 and lie between 1 and 100.

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

```
void main() {
```

```
    int i, count, sum;
```

```
    sum = 0;
```

```
    count = 0;
```

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

```
        if (i%2!=0 && i%3!=0) {
```

```
            sum += i;
```

```
            count++;
```

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

```
            printf(" the sum of value %d in the num %d is %d", sum);
```

```
        return 0;
```

```
}
```

Output:

29

31

35

:

:

49

35

55

83

:

95

Q.19 Modify the program exercise of Q.16

```
#include <stdio.h>
Void main () {
    Int n, i, mid;
    n = 5;
    mid = (int)(n/2);
    for (i=0; i<n; i++) {
        If (i == mid && i == mid)
            printf ("O");
        Else
            printf ("S");
    }
    printf ("\n\n");
    return 0;
}
```

Output:

S	S	S	S	S
S	S	S	S	S
S	S	O	S	S
S	S	S	S	S
S	S	S	S	S

6.20

Given a set of 10 two digit integers. Write a program using for loop to compute the sum of all positive values.

```
#include <stdio.h>
void main() {
    int sum, n, i, j=0;
    sum = 0;
    printf("Input ten numbers");
    for (i=0; i<10; i++) {
        scanf("%d", &n);
        if (n>0) {
            sum += n;
            j++;
        }
        if (sum > 999)
            break;
    }
    printf("The value of positive num %d and the count %d", sum, j);
    return 0;
}
```