UNIVERSITY INSTITUTE OF ENGINEERING AND TECHNOLOGY

PANJAB UNIVERSITY, CHANDIGARH



B.E. Information Technology (2021-25)

• Name : Kunal

• **Roll no.** : UE218058

• **Section** : 2 (group-1)

• **Semester**: 1st / 2021-25 batch

• File : <u>Programming for problem solving</u>

Practical File

• Submitted to - Prof. Monika Meena

1. Program for area of rectangle:

```
#include <stdio.h>
int main()
{
    float l; // 'l' is length of rectangle
    float b; // 'b' is breadth of rectangle

    printf("Enter the length of rectangle: ");
    scanf("%f", &l);

    printf("Enter the breadth of rectangle: ");
    scanf("%f", &b);

    printf("The area of rectangle is: %.2f sq.units", l*b);
    return 0;
}
```

```
"C:\Users\Kunal\Desktop\Code Stuff\Practicals\1_rectangle.exe"

Enter the length of rectangle: 4

Enter the breadth of rectangle: 6

The area of rectangle is: 24.00 sq.units

Process returned 0 (0x0) execution time : 3.321 s

Press any key to continue.
```

2. Program for area of circle & then volume of cylinder w.r.t. its base :

```
#include <stdio.h>
int main()
{
    float r,area,h;
    float pi=3.14;

    printf("\n\nenter the radius & height: ");
    scanf("%f%f", &r,&h);

    area=pi*r*r;
    printf("the area of circle is: %.2f\n", area);

    printf("volume of cylinder is: %.2f\n\n\n", area*h);
    return 0;
}
```

```
■ "C:\Users\Kunal\Desktop\Code Stuff\Practicals\2_circle.exe"

enter the radius & height: 3 6
the area of circle is: 28.26
volume of cylinder is: 169.56

Process returned 0 (0x0) execution time: 6.938 s
Press any key to continue.
```

3. Program for temperature conversion :

```
#include <stdio.h>
int main()
{
    float celc; //temp in celcius
    float fahr; //temp in fahrenheit
    printf("Enter celcius temp: ");
    scanf("%f", &celc);

fahr= (celc*1.8)+32;
    printf("Temperature in fahrenheit is: %.2f\n", fahr);
    return 0;
}
```

```
"C:\Users\Kunal\Desktop\Code Stuff\Practicals\3_temp.exe"
Enter celcius temp: 37.3
Temperature in fahrenheit is: 99.14

Process returned 0 (0x0) execution time: 7.245 s
Press any key to continue.
```

4. Program for simple interest :

```
#include <stdio.h>
int main( ){
             // n is years
  int n;
  float p,r,si; /* p is princple amount
                  r is rate on interest
                  si is simple interest */
  printf("Enter amount: "); scanf("%f", &p);
  printf("Enter years: "); scanf("%d", &n);
  printf("Enter rate of interest: "); scanf("%f",&r);
  si = p*n*r/100;
  printf("simple interest is: %.2f", si);
  return 0;
}
```

```
■ "C:\Users\Kunal\Desktop\Code Stuff\Practicals\4_si.exe"

Enter amount: 12000

Enter years: 15

Enter rate of interest: 8.7

simple interest is: 15660.00

Process returned 0 (0x0) execution time: 17.737 s

Press any key to continue.
```

5. Program for checking even/odd:

```
#include <stdio.h>
int main(){
  int i=0;
  printf("enter the no.:");
  scanf("%d", &i);

if(i%2!=0){
   printf("entered no. is odd\n");
  } else{
   printf("entered no. is even\n");
  }
return 0;
}
```

```
■ "C:\Users\Kunal\Desktop\Code Stuff\Practicals\5_even.exe"
enter the no.: 234
entered no. is even

Process returned 0 (0x0) execution time: 3.791 s
Press any key to continue.

■
```

□ "C:\Users\Kunal\Desktop\Code Stuff\Practicals\5_even.exe" enter the no. : 674567856789 entered no. is odd Process returned 0 (0x0) execution time : 8.156 s Press any key to continue.

6. Program for a leap year :

```
#include <stdio.h>
int main(){
  int y;
  int i;
  printf("Enter the year: ");
  scanf("%d", &y);
  if(y\%4!=0 || (y/100)\%4!=0){}
     printf("Its not a leap year\n");
  } else {
     printf("Its a leap year\n");
  }
  return 0;
  }
"C:\Users\Kunal\Desktop\Code Stuff\Practicals\7_leap.exe"
                                                "C:\Users\Kunal\Desktop\Code Stuff\Practicals\7_leap.exe"
                                                Enter the year: 2020
Enter the year: 2022
                                                Its a leap year
Its not a leap year
                                                Process returned 0 (0x0)
                                                                        execution time : 4.315 s
                      execution time : 7.448 s
Process returned 0 (0x0)
                                                Press any key to continue.
Press any key to continue.
```

■ "C:\Users\Kunal\Desktop\Code Stuff\Practicals\7_leap.exe" Enter the year: 2500 Its not a leap year Process returned 0 (0x0) execution time : 31.341 s Press any key to continue.

7. Program for factorial of any no. entered through keyboard :

```
#include <stdio.h>
int main(){
  int i;
  int k;
 int factorial_i =1;
  printf("Enter the number: ");
  scanf("%d", &i);
  for(k=1;k<=i;k++){
   factorial_i *= k;
  }
   printf("Factorial of entered no. is: %d\n", factorial_i);
   return 0;
}
```

```
□ "C:\Users\Kunal\Desktop\Code Stuff\Practicals\7_factorial.exe"

Enter the number: 3
Factorial of entered no. is: 6

Process returned 0 (0x0) execution time: 3.782 s

Press any key to continue.

□ "C:\Users\Kunal\Desktop\Code Stuff\Practicals\7_factorial.exe"

Enter the number: 7
Factorial of entered no. is: 5040

Process returned 0 (0x0) execution time: 3.065 s

Press any key to continue.
□
□ "C:\Users\Kunal\Desktop\Code Stuff\Practicals\7_factorial.exe"

Enter the number: 7
Factorial of entered no. is: 5040

Process returned 0 (0x0) execution time: 3.065 s

Press any key to continue.
□
□
```

8. Program for calculating table of a no. entered through keyboard :

```
#include <stdio.h>
int main(){
 int i;
  printf("Enter the no. ");
  scanf("%d", &i);
  printf("The table for %d is:\n ", i);
  for(int k=1; k<=10; k++){
    int t;
    t= k*i;
    printf("%d\n", t);
  }
  return 0;
}
```

```
"C:\Users\Kunal\Desktop\Code Stuff\Practicals\8_Table.exe"

Enter the no. 8

The table for 8 is:
8

16

24

32

40

48

56

64

72

80

Process returned 0 (0x0) execution time: 4.531 s

Press any key to continue.
```

```
"C:\Users\Kunal\Desktop\Code Stuff\Practicals\8_Table.exe"
Enter the no. 234
The table for 234 is:
234
468
702
936
1170
1404
1638
1872
2106
2340
                            execution time : 6.016 s
Process returned 0 (0x0)
Press any key to continue.
```

9. Program for table of 10 in reverse order :

```
#include <stdio.h>
int main(){
    printf("The table of 10 in reverse order is :\n");
    for(int i=10; i>=1; i--){
        int t;
        t= i*10;
        printf("%d\n", t);
    }
return 0;
}
```

```
"C:\Users\Kunal\Desktop\Code Stuff\Practicals\9_Table_reverse.exe"
The table of 10 in reverse order is:
100
90
80
70
60
50
40
30
20
10
Process returned 0 (0x0) execution time: 0.094 s
Press any key to continue.
```

```
# 10. (i) Program to sum first ten natural numbers (using while loop)
#include <stdio.h>
int main(){
    int i=1;
    int sum=0;
    while (i<=10)
    {
        sum +=i;
        i++;
    }
    printf("Sum of first ten natural no. is %d.\n", sum);
    return 0;
}</pre>
```

```
"C:\Users\Kunal\Desktop\Code Stuff\Practicals\10i_sum_while.exe"

Sum of first ten natural no. is 55.

Process returned 0 (0x0) execution time : 0.125 s

Press any key to continue.
```

```
#include <stdio.h>
int main(){
   int sum=0;
   for (int i= 1; i < 11; i++)
   {
      sum +=i;
   }
   printf("%d\n", sum);
   return 0;
}</pre>
```

```
"C:\Users\Kunal\Desktop\Code Stuff\Practicals\10ii_sum_for.exe"

Process returned 0 (0x0) execution time: 0.078 s

Press any key to continue.
```

```
#include <stdio.h>
int main(){
   int i=1;
   int sum=0;

   do
   {
      sum+=i;
      i++;
   } while (i>=1 && i<11 );
   printf("%d\n", sum);
   return 0;
}</pre>
```

```
"C:\Users\Kunal\Desktop\Code Stuff\Practicals\10iii_sum_do_while.exe"

Process returned 0 (0x0) execution time : 0.094 s

Press any key to continue.
```

```
11 . (i) Program for factorial of a number (using 'for' loop) :
```

```
#include <stdio.h>
int main(){
  int x; // number
  int f=1; // factorial
  printf("enter the no.:");
  scanf("%d", &x);
  for(int i=1; i<=x; i++){
    f^*=i;
  }
  printf("the factorial of no. is : %d\n", f);
  return 0;
}
```

```
"C:\Users\Kunal\Desktop\Code Stuff\Practicals\8i_factorial_for.exe"
enter the no. : 7
the factorial of no. is : 5040

Process returned 0 (0x0) execution time : 5.039 s
Press any key to continue.
```

```
11 . (ii) Program for factorial of a number (using 'while' loop) :
#include <stdio.h>
int main(){
  int i=1;
  int fact=1;
  printf("Enter the no.:");
  scanf("%d",&i);
  while (i>=1){
    fact *= i;
    i--;
  }
  printf("The factorial of given no. is : %d\n", fact);
  return 0;
}
```

```
"C:\Users\Kunal\Desktop\Code Stuff\Practicals\8ii_factorial_while.exe"

Enter the no. : 7

The factorial of given no. is : 5040

Process returned 0 (0x0) execution time : 3.516 s

Press any key to continue.
```

12 . Program to calculate nth element of Fibonacci sequence :

```
#include <stdio.h>
int fibo(int i);
int main() {
 int i;
 int x;
 printf("enter element no.:");
 scanf("%d",&x);
 for (i = 1; i \le x; i++) {
   printf("%d\t\n", fibo(i));
 return 0;
int fibo(int i){
 if(i==0) {
   return 1;
 if(i==1){
   return 1;
 return fibo(i-1) + fibo(i-2);
```

```
"C:\Users\Kunal\Desktop\Code Stuff\Practicals\12_fibonacci.exe"
enter element no. : 8
1
2
3
5
8
13
21
34
Process returned 0 (0x0) execution time : 5.188 s
Press any key to continue.
```

```
"C:\Users\Kunal\Desktop\Code Stuff\Practicals\12_fibonacci.exe"

enter element no. : 12

1

2

3

5

8

13

21

34

55

89

144

233

Process returned 0 (0x0) execution time : 7.051 s

Press any key to continue.
```

13. Program for calculating sum of first n natural no. :

```
#include <stdio.h>
int addNumbers(int n);
int main() {
  int num;
  printf("Enter a positive integer: ");
  scanf("%d", &num);

  printf("Sum = %d", addNumbers(num));
  return 0;
}
int addNumbers(int n) {
  if (n!= 0)
    return n + addNumbers(n - 1);
  else
  return n;
}
```

```
"C:\Users\Kunal\Desktop\Code Stuff\Practicals\13_sum_n.exe"

Enter a positive integer: 100

Sum = 5050

Process returned 0 (0x0) execution time : 2.334 s

Press any key to continue.
```

14 . Program for printing star pattern :

```
#include <stdio.h>
int rows;
int star(rows);
int main() {
 printf("Enter the number of rows: ");
 scanf("%d", &rows);
 star(rows);
 return 0;
}
int star(rows){
 int i, j;
  for (i = 1; i \le rows; ++i) {
      for (j = 1; j \le i; ++j) {
      printf("* ");
   }
   printf("\n");
 return 0;
```

```
#include<stdio.h>
#include<string.h>
int main() {
 char n[] = "New";
 char y[] = " York";
 char c[] = " City";
 strcat(n, y);
 strcat(n, c);
 printf("%s\n", n);
}
         "C:\Users\Kunal\Desktop\Code Stuff\Practicals\15a_strcat.exe"
         New York City
         Process returned -1073741819 (0xC0000005) execution time : 3.345 s
         Press any key to continue.
```

15.(a). Program for inserting sub-string:

```
15.(b). (i) Program for swapping values ( call by value ) :
#include <stdio.h>
void swapv ( int x, int y );
int main()
{
int a = 43, b = 34;
swapv (a, b);
printf ( "a = \%db = \%d \ n", a, b );
return 0;
}
void swapv ( int x, int y )
{
intt;
t = x;
x = y;
y = t;
printf ( "x = %dy = %d n", x, y );
}
```

```
"C:\Users\Kunal\Desktop\Code Stuff\Practicals\15bi_swap.exe"

x = 34 y = 43

a = 43 b = 34

Process returned 0 (0x0) execution time : 0.167 s

Press any key to continue.
```

```
15.(b). (ii) Program for swapping values ( call by reference ) :
# include <stdio.h>
void swapr ( int *, int * );
int main()
int a = 53, b = 35;
swapr ( &a, &b );
printf ( "a = \%db = \%d\n", a, b );
return 0;
}
void swapr ( int *x, int *y )
{
int t;
t = *x;
*x = *y;
*y = t;
```

```
"C:\Users\Kunal\Desktop\Code Stuff\Practicals\15bii_swap.exe"

a = 35 b = 53

Process returned 0 (0x0) execution time : 0.109 s

Press any key to continue.
```

```
16.(a). Program for finding GCD of two numbers ( using recursion ) :
#include <stdio.h>
int hcf(int n1, int n2);
int main() {
  int n1, n2;
  printf("Enter two positive integers: ");
  scanf("%d %d", &n1, &n2);
  printf("G.C.D of %d and %d is %d.\n", n1, n2, hcf(n1, n2));
  return 0;
}
int hcf(int n1, int n2) {
  if (n2!=0)
    return hcf(n2, n1 % n2);
  else
    return n1;
}
```

```
Select "C:\Users\Kunal\Desktop\Code Stuff\Practicals\16a_gcd.exe"

Enter two positive integers: 72 360
G.C.D of 72 and 360 is 72.

Process returned 0 (0x0) execution time: 6.220 s

Press any key to continue.
```

```
16.(b). Program for finding GCD of two numbers ( using non- recursion ) :
#include <stdio.h>
int main()
{
  int n1, n2, i, gcd;
  printf("Enter two integers: ");
  scanf("%d %d", &n1, &n2);
  for(i=1; i \le n1 && i \le n2; ++i)
  {
    // Checks if i is factor of both integers
    if(n1%i==0 && n2%i==0)
      gcd = i;
  }
  printf("G.C.D of %d and %d is %d", n1, n2, gcd);
  return 0;
}
```

```
"C:\Users\Kunal\Desktop\Code Stuff\Practicals\16b_gcd.exe"
Enter two integers: 9 36
G.C.D of 9 and 36 is 9
Process returned 0 (0x0) execution time : 10.440 s
Press any key to continue.
```

```
17. (a) Program for finding largest & smallest number in a list:
#include<stdio.h>
int main(){
 int a[50],i,num,large,small;
 printf("Enter the number of elements:");
 scanf("%d",&num);
 printf("Input the array elements :\n\n");
 for(i=0;i< num;++i)
   scanf("%d",&a[i]);
 large=small=a[0];
 for(i=1;i<num;++i){
   if(a[i]>large)
    large=a[i];
   if(a[i]<small)
    small=a[i];
 }
 printf("\nsmallest= %d\n",small);
 printf("largest= %d\n",large);
 return 0; }
               "C:\Users\Kunal\Desktop\Code Stuff\Practicals\17a_list.exe"
               Enter the number of elements :6
               Input the array elements :
               smallest= 1
               largest= 987
               Process returned 0 (0x0)
                                    execution time : 12.608 s
```

ress any key to continue.

```
17.(b). Program for sorting array in ascending order :
#include <stdio.h>
void main ( ){
 int num[20];
 int i, j, a, n;
 printf("enter number of elements in an array\n");
 scanf("%d", &n);
 printf("Enter the elements\n");
 for (i = 0; i < n; ++i)
   scanf("%d", &num[i]);
 for (i = 0; i < n; ++i){
  for (j = i + 1; j < n; ++j){
    if (num[i] > num[j]){
      a = num[i];
      num[i] = num[j];
      num[j] = a;
    }
  }
 }
```

```
printf("The numbers in ascending order is:\n");
for (i = 0; i < n; ++i){
    printf("%d\n", num[i]);
}</pre>
```

```
"C:\Users\Kunal\Desktop\Code Stuff\Practicals\17b_sort.exe"
enter number of elements in an array
Enter the elements
34
34
98
46
99
The numbers in ascending order is:
9
34
34
98
99
Process returned 8 (0x8)
                            execution time : 19.342 s
Press any key to continue.
```

```
17.(c) Program for checking if a matrix is symmetric or not :
#include<stdio.h>
int main()
{
int i, j, rows, columns, a[10][10], b[10][10], Count = 1;
printf("\n Please Enter Number of rows and columns : ");
scanf("%d %d", &i, &j);
printf("\n Please Enter the Matrix Elements \n");
for(rows = 0; rows < i; rows++){</pre>
 for(columns = 0;columns < j;columns++){</pre>
   scanf("%d", &a[rows][columns]);
  }
}
 //Transpose of matrix
for(rows = 0; rows < i; rows++){
 for(columns = 0;columns < j; columns++){</pre>
   b[columns][rows] = a[rows][columns];
}
}
for(rows = 0; rows < i; rows++){</pre>
  for(columns = 0; columns < j; columns++){</pre>
    if(a[rows][columns] != b[rows][columns]){
      Count++;
```

```
break;
    }
}
if(Count == 1) {
    printf("\n The Matrix that you entered is a Symmetric Matrix ");
}else
{
printf("\n The Matrix that you entered is Not a Symmetric Matrix ");
}
return 0;
}
```

```
"C:\Users\Kunal\Desktop\Code Stuff\Practicals\17c_matrix.exe"

Please Enter Number of rows and columns : 3 3

Please Enter the Matrix Elements
1 2 3
2 3 4
3 4 5

The Matrix that you entered is a Symmetric Matrix

Process returned 0 (0x0) execution time : 41.114 s

Press any key to continue.
```

```
#include<stdio.h>
int main()
{
 // declare variables
 char str[200];
 int line, word, ch;
 // initialize count variables with zero
 line = word = ch = 0;
 // read multiline string
 printf("Enter string terminated with ~ :\n\n");
 scanf("%[^~]", str);
 // check every character
 for(int i=0; str[i]!='\0'; i++)
 {
   // if it is new line then
   // one line and one word completed
   if(str[i]=='\n')
   {
     line++;
```

```
word++;
 }
 // else it is a character
 else
 {
   // if character is space or tab
   // then one word is also completed
   if(str[i]==' '||str[i]=='\t')
   {
     word++;
     ch++;
   }
   // it was not '\n', sapace or tab
   // it is a normal character
   else {
     ch++;
   }
 }
}
```

```
// display count values
printf("\nCharacter counts = %d\n", ch);
printf("Word counts = %d\n", word);
printf("Line counts = %d\n", line);
return 0;
}
```

```
"C:\Users\Kunal\Desktop\Code Stuff\Practicals\18_text.exe"

Enter string terminated with ~ :

Hard time create great men
Great men create good time
Good time create weak men
Weak men creat hard time
~

Character counts = 101
Word counts = 20
Line counts = 4

Process returned 0 (0x0) execution time : 26.595 s

Press any key to continue.
```