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Second Year. B.TECH

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(DAA Lab Work)

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1. Write a program to find sum of first n natural numbers using function

CODE:

```
//write a program to find sum of first n natural numbers using function
#include <stdio.h>
int sum(int n) {
int sum=0,i;
for (i=1;i<=n;i++) {
sum+=i;
}
printf("the sum of %d natural numbers are %d",n,sum);
}
int main() {
int n;
printf("enter till which natural number do u want the sum to printed:");
scanf("%d",&n);
sum(n);
printf("\nCH.SC.U4CSE24110");
}
```

OUTPUT:

```
C:\Users\mrgns\Downloads>gcc sumn.c -o sumn

C:\Users\mrgns\Downloads>.\sumn
enter till which natural number do u want the sum to printed:5
the sum of 5 natural numbers are 15
CH.SC.U4CSE24110
```

SPACE COMPLEXITY:

Int variables sum, i, n= 4+4+4 so O(1) since all of them are constant.

2. Write a program to find sum of squares first n natural numbers using function.

CODE:

```
//write a program to find sum of squares first n natural numbers using function
#include <stdio.h>
int sum(int n) {
int sum=0,i;
for (i=1;i<=n;i++) {
sum+=(i*i);
}
printf("the sum of %d natural numbers are %d\n",n,sum);
}
int main() {
int n;
printf("enter till which natural number do u want the sum to printed:");
scanf("%d",&n);
sum(n);
printf("CH.SC.U4CSE24110");
}
```

OUTPUT:

```
C:\Users\mrgns\Downloads>gcc sumnn.c -o sumnn

C:\Users\mrgns\Downloads>.\sumnn
enter till which natural number do u want the sum to printed:8
the sum of 8 natural numbers are 204
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```

SPACE COMPLEXITY:

Int variables sum, i, n= 4+4+4 so O(1) since all of them are constant.

3. Write a program to find sum of cube first n natural numbers

CODE:

```c
//write a program to find sum of cubes first n natural numbers using function
#include <stdio.h>
int sum(int n) {
int sum=0,i;
for (i=1;i<=n;i++) {
sum+=(i*i*i);
}
printf("the sum of %d natural numbers are %d\n",n,sum);
}
int main() {
int n;
printf("enter till which natural number do u want the sum to printed:");
scanf("%d",&n);
sum(n);
printf("CH.SC.U4CSE24110");
}
```

OUTPUT:

```
C:\Users\mrgns\Downloads>gcc sumnnn.c -o sumnnn

C:\Users\mrgns\Downloads>.\sumnnn
enter till which natural number do u want the sum to printed:9
the sum of 9 natural numbers are 2025
CH.SC.U4CSE24110
```

SPACE COMPLEXITY:

Int variables sum, i, n= 4+4+4 so O(1) since all of them are constant.

4. Write a program to find factorial of integer n using recursion

CODE:

```c
//write a program to find factorial of integer n using recursion
#include <stdio.h>
int factorial(int n) {
if (n==1) {
return 1; }
return n*factorial(n-1);
}
int main() {
int n,x;
printf("enter till which natural number do u want the factorial to printed:");
scanf("%d",&n);
x=factorial(n);
printf("the factorial is %d",x);
printf("\nCH.SC.U4CSE24110");
}
```

OUTPUT:

```
C:\Users\mrgns\Downloads>gcc fact.c -o fact

C:\Users\mrgns\Downloads>.\fact
enter till which natural number do u want the factorial to printed:7
the factorial is 5040
CH.SC.U4CSE24110
```

SPACE COMPLEXITY:

Recursion used: n times so O(n) * O(1)= O(n)

5. Write a program to find transposing 3x3 matrix

CODE:

```c
//write a program to find transposing 3x3 matrix
#include <stdio.h>
int main() {
int i,j,r1,c1;
printf("enter value for row and column of matrix 1:");
scanf("%d %d",&r1,&c1);
int m1[r1][c1];
for (i=0;i<r1;i++) {
for (j=0;j<c1;j++) {
printf("enter value for %d row %d column matrix1:",i,j);
scanf("%d",&m1[i][j]);
}
}
printf("matrix:\n");
for (i=0;i<r1;i++) {
for (j=0;j<c1;j++) {
printf("%d\t",m1[i][j]);
}
printf("\n");
}
int t[c1][r1];
for (i=0;i<c1;i++) {
for (j=0;j<r1;j++) {
t[i][j]=m1[j][i];
}
}
printf("transposed matrix:\n");
for (i=0;i<c1;i++) {
for (j=0;j<r1;j++) {
printf("%d\t",t[i][j]);
}
printf("\n");
}
printf("\nCH.SC.U4CSE24110");
}
```

OUTPUT:

```
C:\Users\mrgns\Downloads>gcc matrix.c -o matrix

C:\Users\mrgns\Downloads>.\matrix
enter value for row and column of matrix 1:3 3
enter value for 0 row 0 column matrix1:1
enter value for 0 row 1 column matrix1:2
enter value for 0 row 2 column matrix1:3
enter value for 1 row 0 column matrix1:4
enter value for 1 row 1 column matrix1:5
enter value for 1 row 2 column matrix1:6
enter value for 2 row 0 column matrix1:7
enter value for 2 row 1 column matrix1:8
enter value for 2 row 2 column matrix1:9
matrix:
1       2       3
4       5       6
7       8       9
transposed matrix:
1       4       7
2       5       8
3       6       9

CH.SC.U4CSE24110
```

SPACE COMPLEXITY:

Two matrix created: 2*O(r*c) = O(r*c)

If only for 3x3 matrix: O(9)=O(1) since size is fixed

6. Write a program to find fibonacci of integer n using recursion

CODE:

```c
//write a program to find fibonacci of integer n using recursion
#include <stdio.h>
int fibonacci(int n) {
if (n==0) {
return 0; }
if (n==1) {
return 1; }
return fibonacci(n-1)+fibonacci(n-2);
}
int main() {
int n,x;
printf("enter which number do u want the fibonacci to printed:");
scanf("%d",&n);
x=fibonacci(n);
printf("the fibonacci is %d",x);
printf("\nCH.SC.U4CSE24110");
}
```

OUTPUT:

```
C:\Users\mrgns\Downloads>gcc fibonacci.c -o fibonacci

C:\Users\mrgns\Downloads>.\fibonacci
enter which number do u want the fibonacci to printed:6
the fibonacci is 8
CH.SC.U4CSE24110
```

SPACE COMPLEXITY:

Recursion grows linearly n times so O(n)