Design and Analysis of
Algorithm
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1.Write a program to find the sum of first n natural numbers using user defined function .

main.c

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

int natSum(int n){
    int sum = 0;
    for(int i=1; i<=n; i++){
        sum+=i;
    }
    return sum;
}

int main(){
    int n;
    printf("Enter a postive integer: ");
    scanf("%d",&n);
    int final = natSum(n);
    printf("Sum of numbers till %d: %d",n,final);
    return 0;
}
```

Output

```
Enter a postive integer: 6
Sum of numbers till 6: 21

=== Code Execution Successful ===
```

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

main.c

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

int natSqrSum(int n){
    int sum = 0;
    for(int i=1; i<=n; i++){
        sum+= i*i;
    }
    return sum;
}

int main(){
    int n;
    printf("Enter a postive integer: ");
    scanf("%d",&n);
    int final = natSqrSum(n);
    printf("Sum of sqaures of numbers till %d: %d",n,final);
    return 0;
}
```

Output

```
Enter a postive integer: 6
Sum of sqaures of numbers till 6: 91

=== Code Execution Successful ===
```

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3.Write a program to find the sum of cubes of fours n natural numbers .

main.c

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

int natCubeSum(int n){
    int sum = 0;
    for(int i=1; i<=n; i++){
        sum+= i*i*i;
    }
    return sum;
}

int main(){
    int n;
    printf("Enter a postive integer: ");
    scanf("%d",&n);
    int final = natCubeSum(n);
    printf("Sum of cube of numbers till %d: %d",n,final);
    return 0;
}
```

Output

```
Enter a postive integer: 6
Sum of cube of numbers till 6: 441

=== Code Execution Successful ===
```

4.Write a program to find the factorial of a number using recursive functions.

main.c

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

int factorial(int n){
    if(n==0||n==1){
        return 1;
    }else{
        return n*factorial(n-1);
    }
}

int main(){
    int n;
    printf("Enter a postive integer: ");
    scanf("%d",&n);
    int final = factorial(n);
    printf("factorial of number %d: %d",n,final);
    return 0;
}
```

Output

```
Enter a postive integer: 6
factorial of number 6: 720

=== Code Execution Successful ===
```

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5.Write a program to transpose a 3x3 matrix.

main.c

```c
#include <stdio.h>
#include <stdlib.h>
void transpose(int mtx[3][3],int trans[3][3]){
    for(int i=0; i<3; i++){
        for(int j=0; j<3; j++){
            trans[j][i]=mtx[i][j];
        }
    }
}
int main() {
    int mtx[3][3],trans[3][3];
    printf("Enter elements of 3x3 matrix: \n");
    for(int i=0; i<3; i++){
        for(int j=0; j<3; j++){
            scanf("%d",&mtx[i][j]);
        }
    }
    transpose(mtx,trans);
    printf("transpose of matrix: \n");
    for(int i=0; i<3; i++){
        for(int j=0; j<3; j++){
            printf("%d ",trans[i][j]);
        }
        printf("\n");
    }
    return 0;
}
```

Design and Analysis of Algorithm
Pranav.N
CH.SC.U4CSE24236

Output

```
Enter elements of 3x3 matrix:
3
4

6
7
8
2
9
12
13
transpose of matrix:
3 7 9
4 8 12
6 2 13


=== Code Execution Successful ===
```

Design and Analysis of
Algorithm
Pranav.N
CH.SC.U4CSE24236
6.Write a program to print the fibonacci series for the first n natural numbers using user defined function.

main.c

```c
#include <stdio.h>
#include<stdlib.h>
void fibonacci(int n){
    int a=0,b=1,c;
    if(n>=1)
        printf("%d ",a);
    if(n>=2)
        printf("%d ",b);
    for(int i=3; i<=n; i++){
        c = a+b;
        printf("%d ",c);
        a = b;
        b = c;
    }
}
int main(){
    int n;
    printf("Enter positive integer: ");
    scanf("%d",&n);
    printf("fibonacci series up to %d terms: ",n);
    fibonacci(n);
    return 0;
}
```

Design and Analysis of
Algorithm
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