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## ① Binary search using Recursion

```

#include <stdio.h>
int binarySearch(int a[], int l, int h,
                  int elem)
int n;
int main()
{
    int a[100], val;
    printf("Enter the number of elements\n");

    scanf("%d", &n);

    printf("Enter the elements of array\n in ascending order\n");

    for(int i=0; i<n; i++)
        scanf("%d", &a[i]);

    printf("Enter the element to be searched\n");

    scanf("%d", &val);

    int answer = binarySearch(a, 0, n-1, val);
    if (answer == -1)
        printf("Element is not present\n");
    else
        printf("Element is present at\n %d\n", answer);
}

```

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```

int binarysearch(int a[], int l, int h,
                 int item)
{
    int mid = (l+h) / 2

    if (a[mid] == item)
        return mid;

    else if (a[mid] > item)
        return binarysearch(a, l, mid-1,
                             item);

    else if (a[mid] < item)
        return binarysearch(a, mid+1, h,
                             item);

    else
        return -1;
}

```

## ② Factorial using Recursion

```

#include <stdio.h>
int fact(int n);
int main()
{
    int n, val;
    printf("Enter the number n", n);
    scanf("%d", &n);
    val = fact(n);
    printf("factorial is %d\n", val);
}

```



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```

int fact(int n)
{
    if (n == 1)
    {
        return 1;
    }
    else
    {
        return (n * fact(n-1));
    }
}

```

③ Fibonacci using recursion

```

#include <stdio.h>
int fib(int n);
int main()
{
    int n, val;
    printf ("Enter the number of terms\n");

    scanf ("%d", &n);

    printf ("Fibonacci sequence is %d\n", n);

    for (int i=0; i<n; i++)
    {
        val = fib(i);
        printf ("%d\t", val);
    }
    return 0;
}

```

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```
int fib(int n)
{
    if (n == 0)
        return 0;

    else if (n == 1)
        return 1;

    else
        return (fib(n-1) + fib(n-2));
}
```

④ GCD using recursion

```
#include <stdio.h>
int gcd(int x, int y)
int main()
{
    int x, y;
    printf("Enter two numbers\n");
    scanf("%d %d", &x, &y);
    int answer = gcd(x, y);
    printf("GCD is: %d\n", answer);
}

int gcd(int x, int y)
{
    int rem = x % y;
    if (rem == 0)
        return y;
    else
        return gcd(y, rem);
}
```



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### ③ Tower of hanoi

```
#include <stdio.h>
void move (int n, char a, char b, char c);
int main ()
{
```

```
    int n;
    printf ("Enter the number of discs to be moved\n");
```

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

```
    printf ("A: Source\nB: spare\nC: Destination");
```

```
    move (n, 'A', 'C', 'B');
```

```
    return 0;
```

```
}
```

```
void move (int n, char source, char destination, char spare)
```

```
{
```

```
    if (n == 1)
        printf ("Move from %s to %s\n", source, destination);
```

```
    else
    {
```

```
        move (n-1, source, spare, destination);
        move (1, source, destination, spare);
```

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move (n-1, spare, destination, source):

{

{

ata);

;