Let's Start

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History

```
int main()
{
    int arr[]={1,2,3,4,5,6,7,8,9,10};
     for(int i = 0 ; i < 10 ; i++)
     {
          if(arr[i] % 2==0)
            cout<< arr[i] << " is Even\n";
          else
            cout<< arr[i] << " is Odd\n";
     }
     return 0;
}
```

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```
int main()
{
        int arr[]={1,2,3,4,5,6,7,8,9,10},i=0;
    myLoop:
        if (i > 9)
            goto end;
        if(arr[i]%2 == 0)
            goto Even_Numbers;
        else
            goto Odd_Numbers;
    Even_Numbers:
        cout << arr[i]<< " is even" << endl;
        i++;
        goto myLoop;
    Odd_Numbers:
        cout<<arr[i]<< " is Odd" << endl;
        i++;
        goto myLoop;
    end:
}
```

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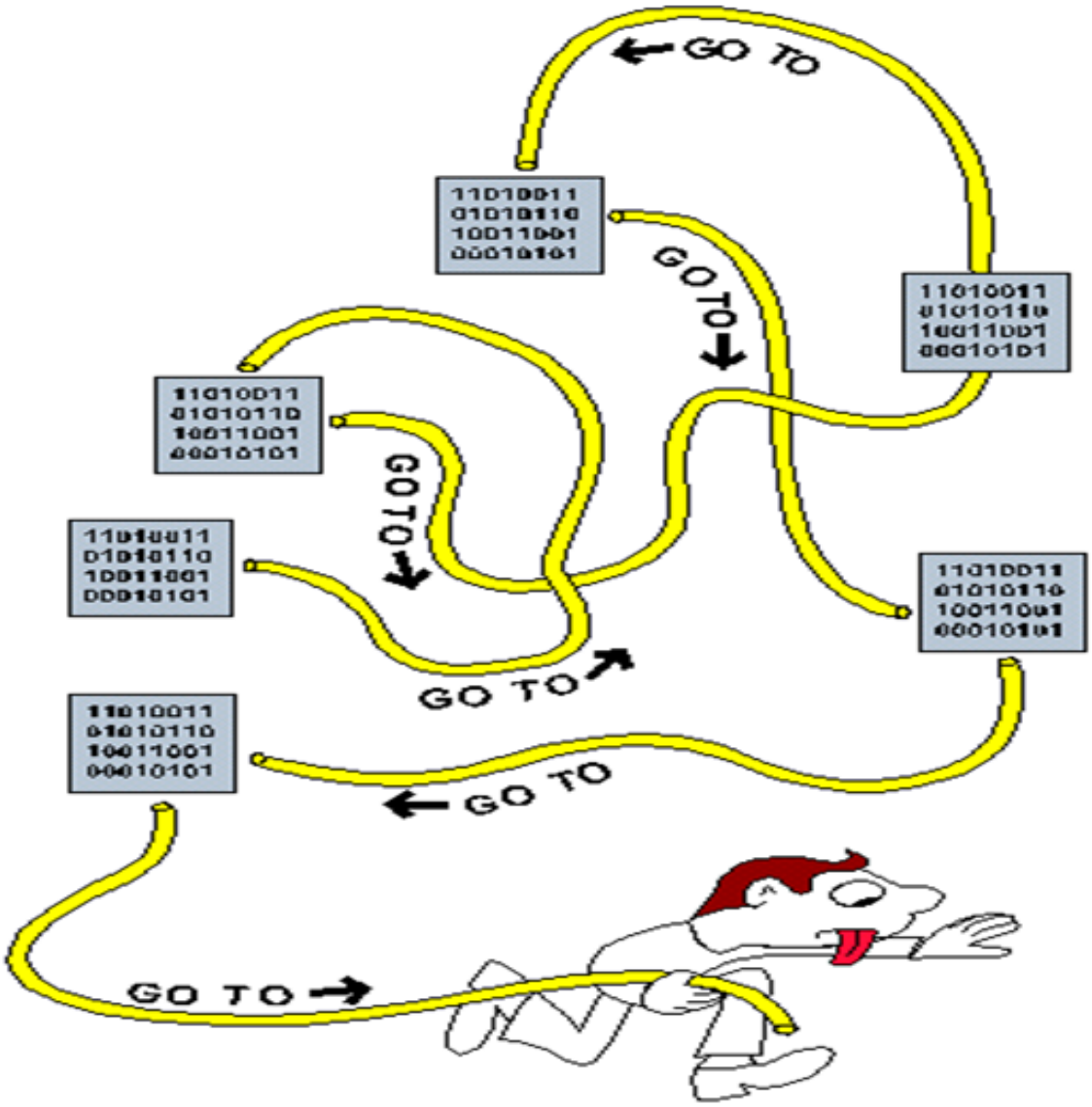

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Spaghetti

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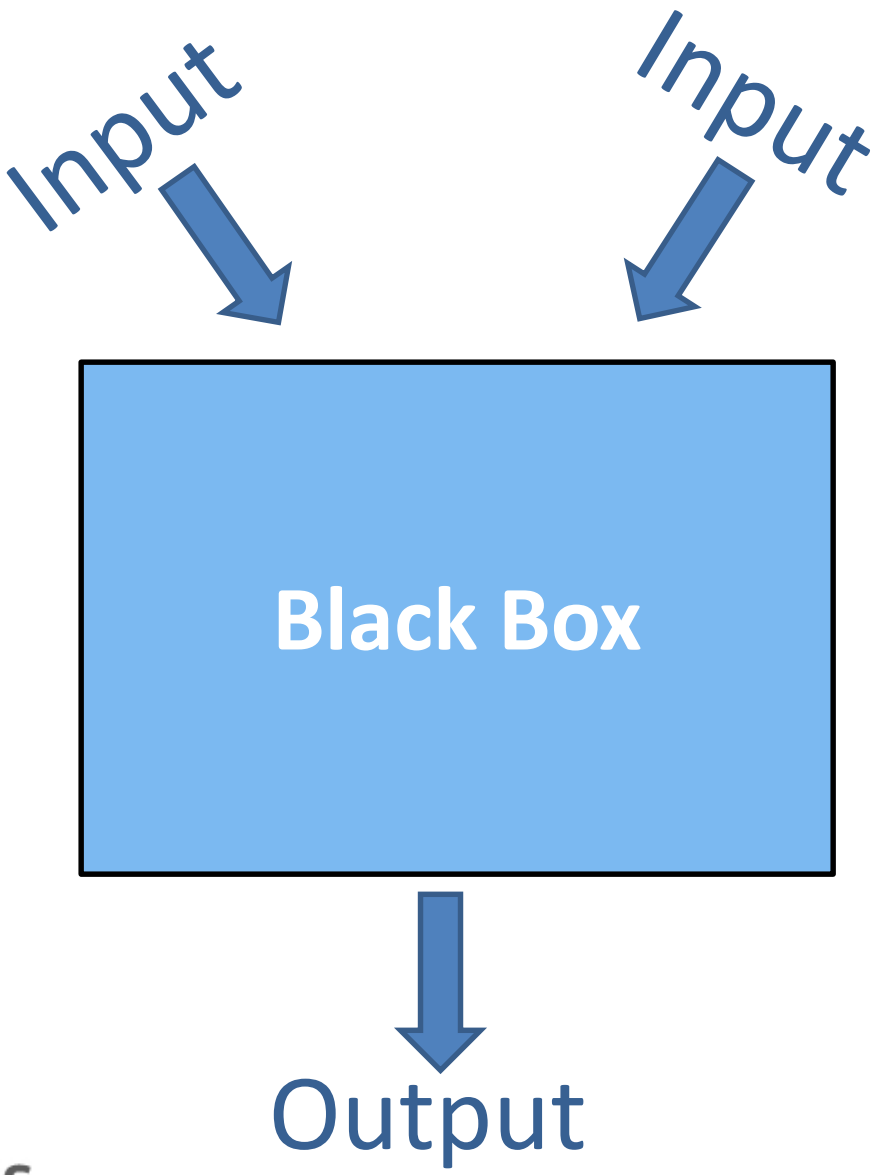
Mathematical Functions

$$f(x) = x^2 + x + 10$$

$$f(x, y) = x^{2+y} + xy + 10$$

Functions



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"ايها الناس
المكنة طلعت قماش"

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How ???

Function Definition

```
[Return Type][Function name]()
{
    [Function Body]
}
```

```
قماش مكنة ( قطن )
{
    .....;
    .....;
    .....;
    return قماش ;
}
```

Where ??

```
int main()
{
    .......;
    return 0;
}
```

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Questions ??

```
int Add (int a, int b)
{
   int sum = a + b;
   return sum;
}
```

```
int main()
{
    int n = 3, m = 2;
    int sum = 0;
    sum = Add( n, m );
    cout<< sum ;          //5
    return 0;
}
```

```
float PI()
{
  return 3.14159265359;
}
```

```
int main()
{
    float var;
    var = PI();
    cout<< var;//3.14159265359
    return 0;
}
```

```
void printchars(char c)
{
   for(int i=0;i<10;i++)
          cout<< c;
      cout<< endl;
}
```

```
int main()
{
    char c = '#';
    printChars( c );
    return 0;
}
```

```
void printStarsLine()
 {
    for(int i=0;i<10;i++)
            cout<<"*";
       cout<<endl;
 }
```

```
int main()
{
   printStarsLine();
   return 0;
}
```

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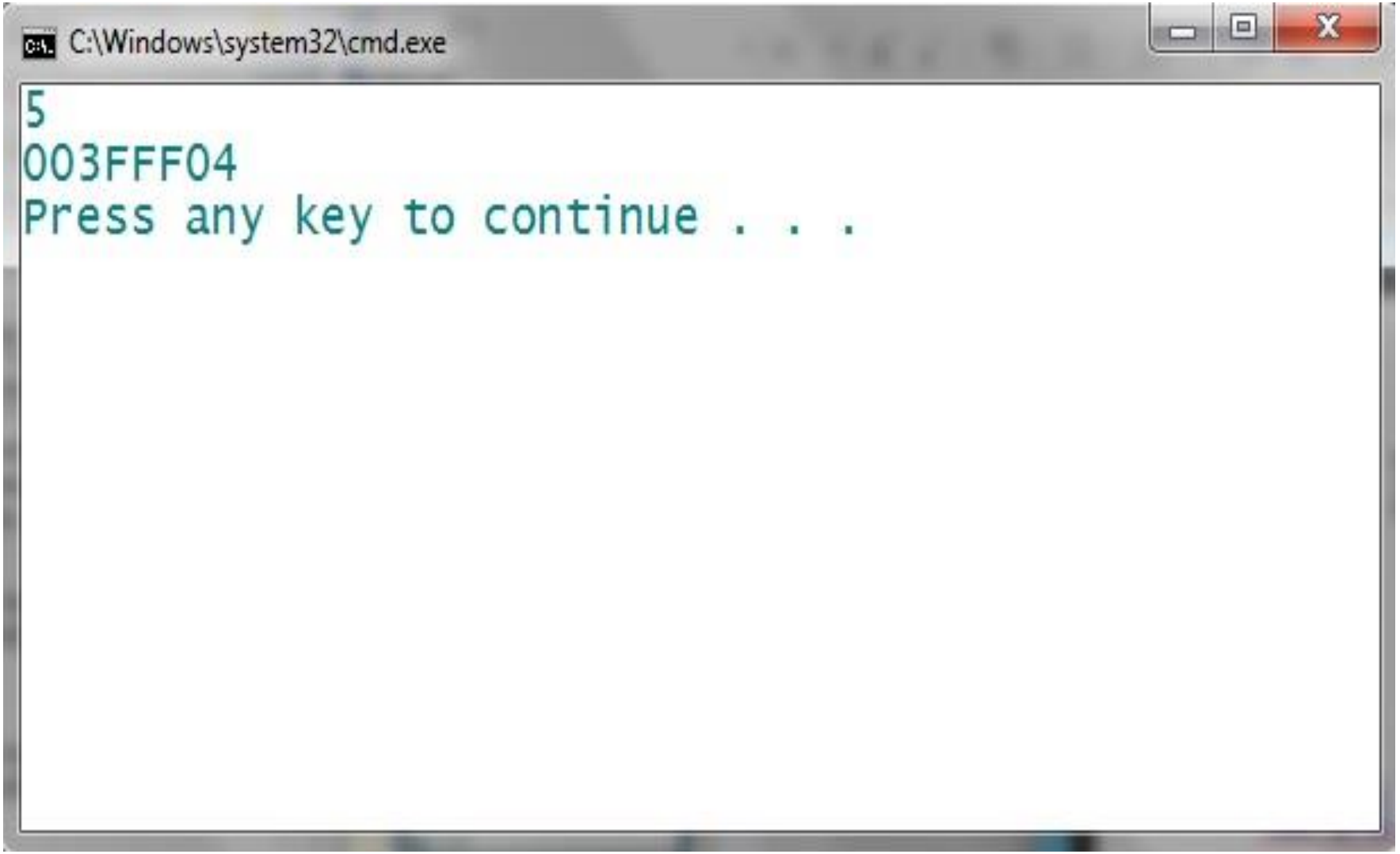
Questions ??

```
int main()
{
   int a = 5;
   cout<< a<<endl;
   cout<< &a<< endl;
}
```



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Passing Arguments

Take a number,
Give "Hoda" a copy,
Pass it to someone to
increment

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By Value

Argument

Variable

F(Argument)

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```
#include <iostream>
using namespace std;

void PassByValue(int y)
{
    cout<< "Passed Value= " << y <<endl;
    y++;
    cout<< "Passed Value= " << y <<endl;
}
int main()
{
    int x = 10;
    PassByValue(x);
    cout << "Orginial Value = " << x << endl;
    return 0;
}
```

//10

//11

//10

Take a number,

Pass it to someone to

increment

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By Reference

Argument

Variable

F(Argument)

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```
#include <iostream>
using namespace std;

void PassByReference(int &y)
{
    cout<< "Passed Value= " << y <<endl;
    y++;
    cout<< "Passed Value= " << y <<endl;
}
int main()
{
    int x = 10;
    PassByReference(x);
    cout << "Orginial Value = " << x << endl;
    return 0;
}
```

//10

//11

//11

Passing Array to Function

```
void  fillArr (int myArr[],int n)
{
     for(int i=0;i<n;i++)
          myArr[ i ] = i+1;
}
```

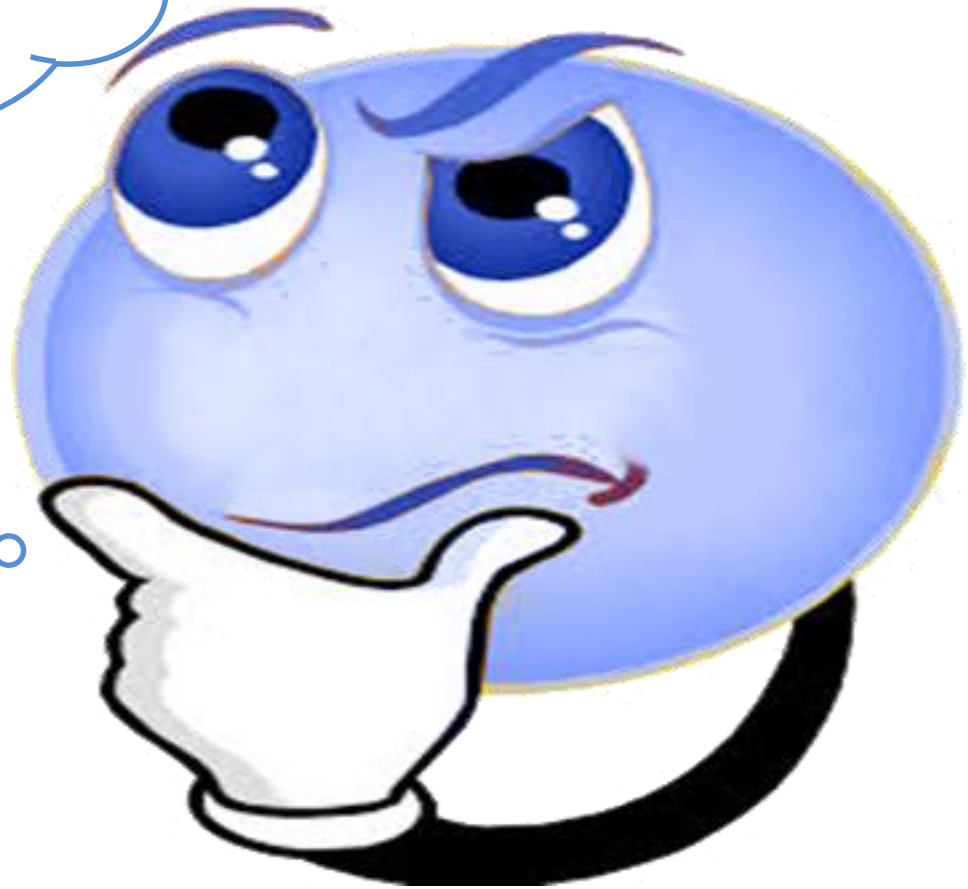
```
int main()
{
    int arr[ 5 ];
    fillArr( arr, 5 );
    for( int i=0 ; i<5 ; i++ )
        cout<< arr[i] << " ";
    cout<<endl;
    return 0;
}
```

```
//1 2 3 4 5
```

Questions ??

Where to go

!!!



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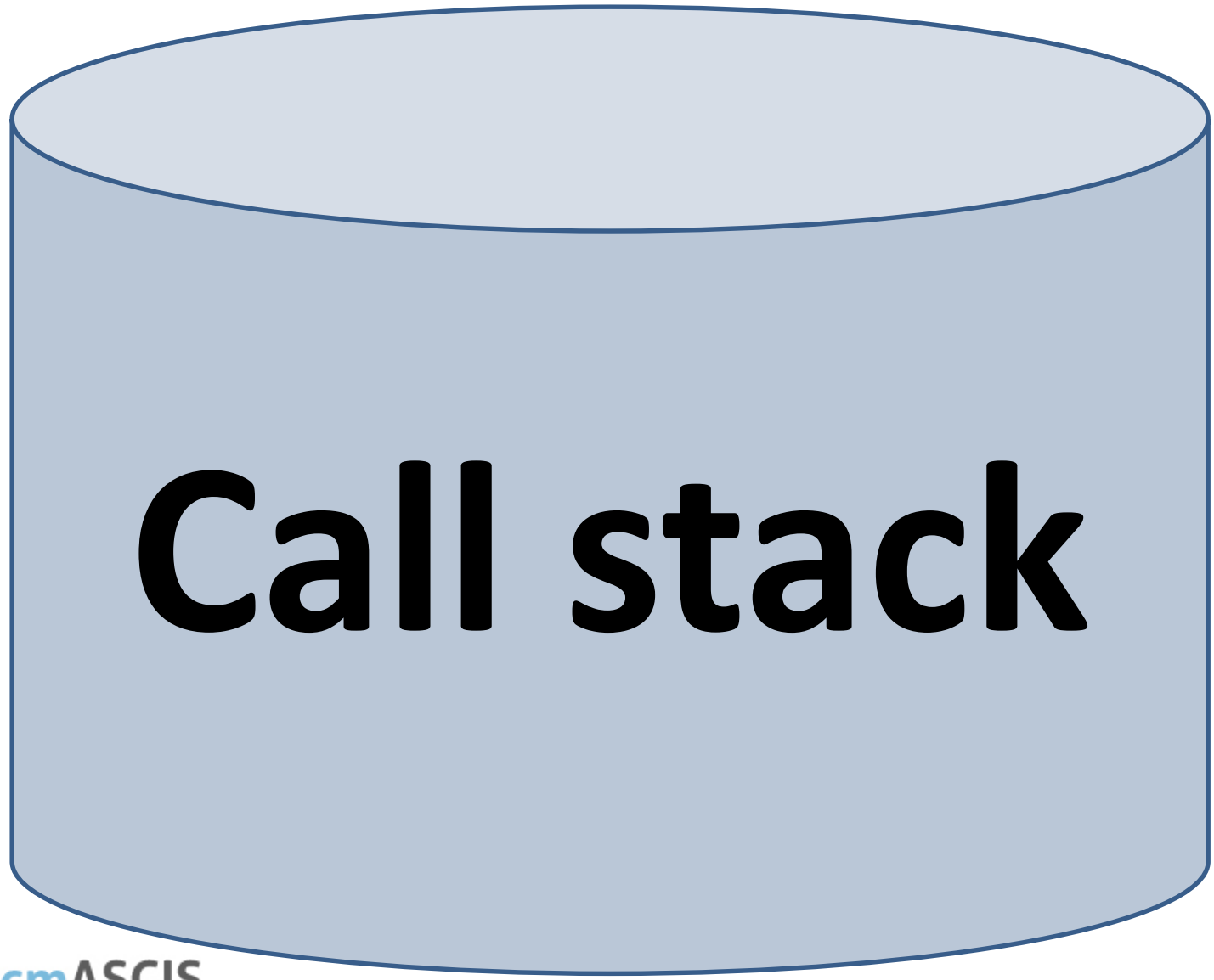

Functions backend

Activation Record

Parameters	Local variables	Return address

Addition

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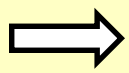
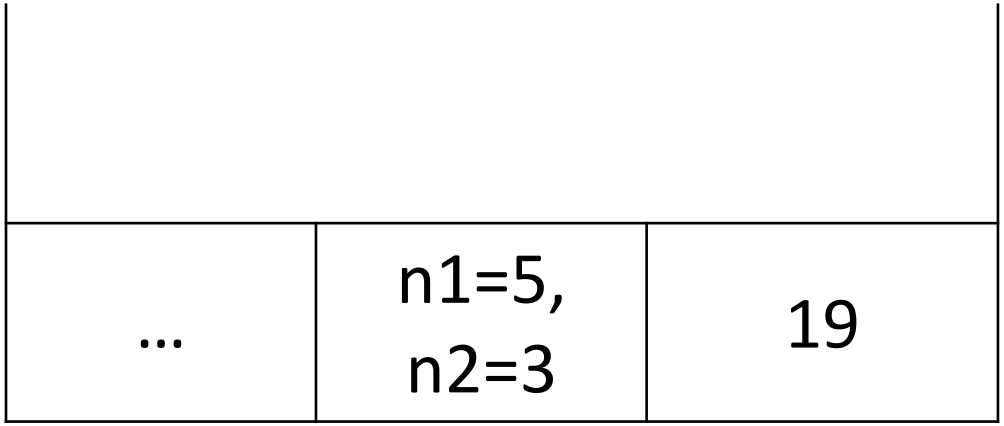
```
16 int main ()
17 {
18     int n1 = 5, n2 = 3 ;
19     int result = Add( n1,n2);
20     cout << result << endl;
21 }
```



```
                                    // a=5  // b=3
11    int Add ( int a, int b   )
12    {
13 ⇨      int sum = a + b;
14        return sum;
15    }
```



Function Returns

```
                          // a=5    // b=3
11    int Add ( int a, int b   )
12    {
13       int sum = a + b;
14 ⇨     return sum;    // sum=8
15    }
```

…	n1=5, n2=3	19

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Function Returns

```
16  int main ()
17  {
18      int n1 = 5, n2 = 3 ;
19      int result = Add( n1, n2);
20      cout << result << endl;
21  }
```

// result = 8

Multiplication

```
16 int main ()
17 {
18     int n1 = 5, n2 = 3 ;
19 ⇨   int result = Multiply( n1,n2);
20     cout << result << endl;
21 }
```

```
                                    // c=5 // d=3
6     int Multiply( int c, int d )
7     {
8  ⇨      int mul = c * d;
9         return mul;
10    }
```

…	n1=5, n2=3	19

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Function Returns

```
                                  // c=5    // d=3
6     int Multiply( int c, int d )
7     {
8        int mul= c * d;
9 ⇨      return mul;          // mul = 15
10    }
```

…	n1=5, n2=3	19

Function Returns

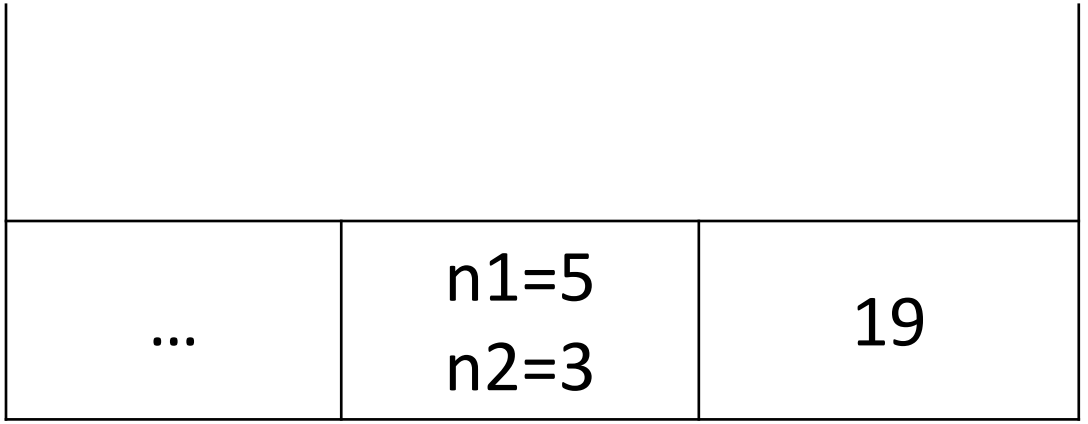
```
16  int main ()
17  {
18      int n1 = 5, n2 = 3 ;
19      int result = Multiply( n1, n2);
20      cout << result << endl;
21  }
```

// result = 15

Subtraction

```
16 int main ()
17 {
18     int n1 = 5, n2 = 3 ;
19     int result = Subtract( n1,n2);
20     cout << result << endl;
21 }
```

```
                    // e=5   // f=3
1     int Subtract( int e, int f)
2     {
3 ⇨       int sub = e - f ;
4         return sub;
5     }
```



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Function Returns

```
                        // e=5    // f=3
1       int Subtract( int e, int f)
2       {
3           int sub = e - f ;
4   ⇨       return sub;  // sub=2
5       }
```

	n1=5, n2=3	19

Function Returns

```
16  int main ()
17  {
18      int n1 = 5, n2 = 3 ;
19      int result = Subtract( n1, n2);
20      cout << result << endl;
21  }
```

// result = 2

Questions ??

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