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**TUE – The Technological Universities in Egypt**  
**NCTU – New Cairo Technological University**  
**Faculty of Industry and Energy Technology**  
**Information Technology Department**  
**First-Year**

**Course:** Programming Essentials in C

*Functions*

*Presented by*

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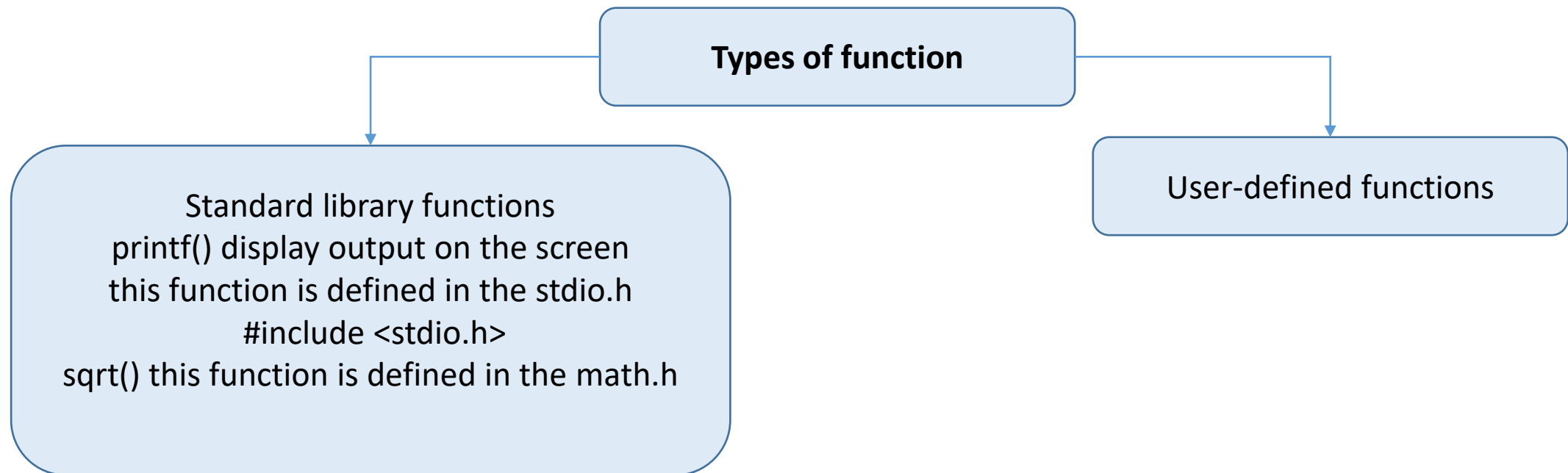
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# C Functions

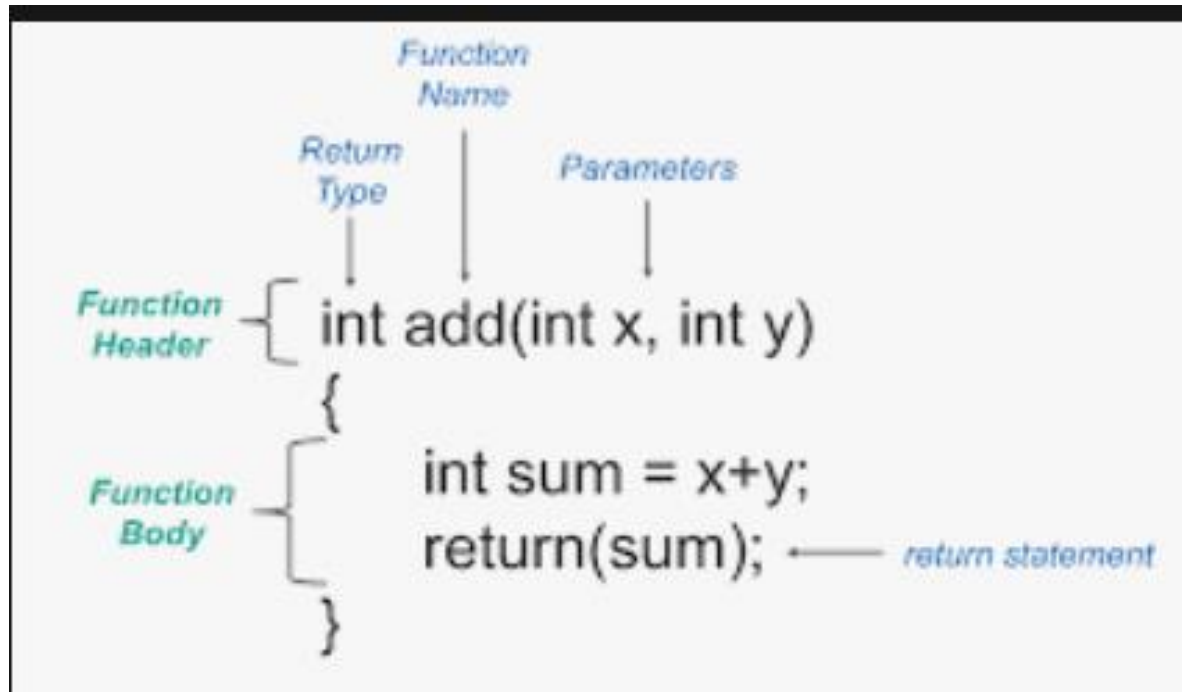
- A function is a block of code that performs a specific task.
- Dividing a complex problem into smaller chunks makes our program easy to understand and reuse.



# Advantages of user-defined function

- The program will be easier to understand, maintain and debug.
- Reusable codes that can be used in other programs
- A large program can be divided into smaller modules. Hence, a large project can be divided among many programmers.

# User-defined function



```
#include <stdio.h>
void functionName()
{
    ... ..
    ... ..
}

int main()
{
    ... ..
    ... ..

    functionName();

    ... ..
    ... ..
}
```

## How function works in C programming?

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

```
void functionName()
```

```
{
```

```
... ..
```

```
... ..
```

```
}
```

```
int main()
```

```
{
```

```
... ..
```

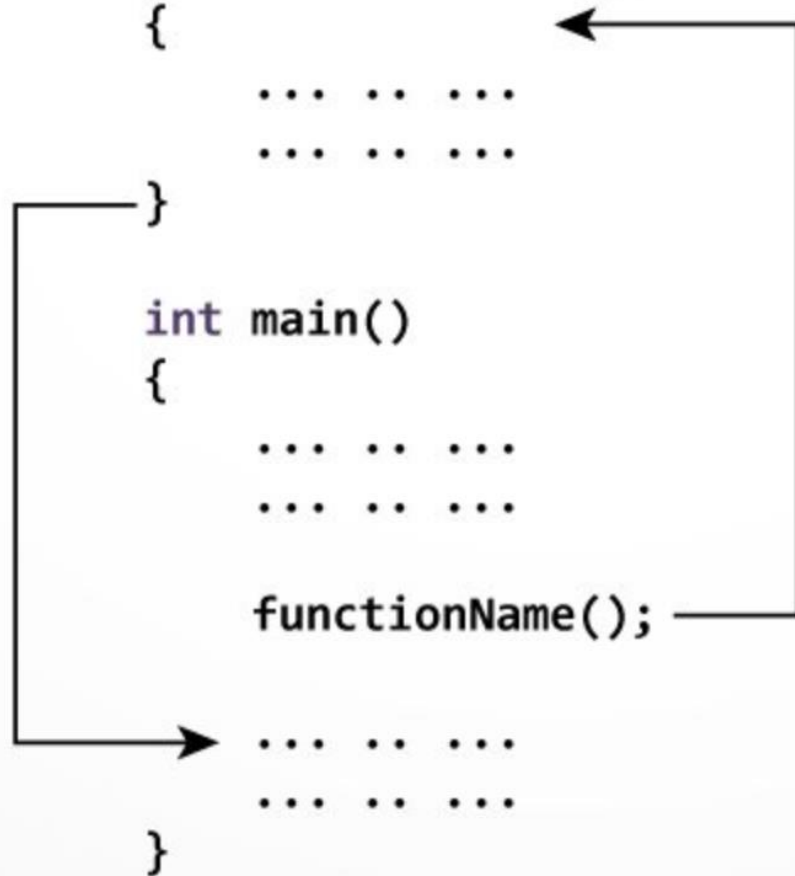
```
... ..
```

```
functionName();
```

```
... ..
```

```
... ..
```

```
}
```





main.c

```
1  /* Sum of two numbers - Example for global variable */
2  #include<stdio.h>
3  #include<conio.h>
4  void sum(void);
5  int a, b;
6  void main()
7  {
8  printf("\nEnter two numbers: ");
9  scanf("%d%d", &a, &b);
10 sum();
11 getch();
12 }
13 void sum (void)
14 {
15 printf("The Sum is %d", a+b);
16 }
```

outputs

```
Enter two numbers: 33 5
The Sum is 38
```



```
1  /* Sum of two numbers - Example for global variable */
2  #include<stdio.h>
3  void sum(void);
4  int a, b;
5  int main()
6  {
7  printf("\nEnter two numbers: ");
8  scanf("%d%d", &a, &b);
9  sum();
10 return 0;
11 }
12 void sum (void)
13 {
14 printf("The Sum is %d", a+b);
15 }
```

outputs

```
Enter two numbers: 33 5
The Sum is 38
```

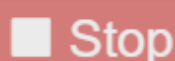


main.c

```
1  /* Sum of two numbers - Example for Function with no
2  arguments and no return value */
3  #include<stdio.h>
4  void sum (void)
5  {
6  int a, b;
7  printf("\nEnter two numbers: ");
8  scanf("%d%d", &a, &b);
9  printf("The Sum is %d", a+b);
10 }
11 int main()
12 {
13 sum(); /* Function Call */
14 return 0;
15 }
```

outputs

```
Enter two numbers: 33 5
The Sum is 38
```



main.c

```
1  /* Sum of two numbers - Example for Function with
2  arguments and no return value - Call by value */
3  #include<stdio.h>
4  void sum(int, int);
5  int main()
6  {
7  int a, b;
8  printf("\nEnter two numbers: ");
9  scanf("%d%d", &a, &b);
10 sum(a, b); /* Function Call */
11 return 0;
12 }
13 void sum (int a, int b)
14 {
15 printf("The Sum is %d", a+b);
16 }
```

outputs

```
Enter two numbers: 33 5
The Sum is 38
```



main.c

```
1  /* Sum of two numbers - Example for Function with
2  arguments and with return value - Call by value */
3  #include<stdio.h>
4  int sum(int, int); /*Function Prototype */
5  int main()
6  {
7      int a, b;
8      printf("\nEnter two numbers: ");
9      scanf("%d%d", &a, &b);
10     printf("The Sum is %d", sum(a, b)); /* Call by value */
11     return 0;
12 }
13 int sum (int a, int b)
14 {
15     return a+b;
16 }
```

outputs

```
Enter two numbers: 33 5
The Sum is 38
```



Run



Debug



Stop



Share



Save

{ } Beautify



main.c

```
1  /* Sum of two numbers - Example for Function with no
2  arguments and with return value */
3  #include<stdio.h>
4  int sum(void);
5  int main()
6  {
7  printf("The Sum is %d", sum()); /* Function Call */
8  return 0;
9  }
10 int sum (void)
11 {
12 int a, b;
13 printf("\nEnter two numbers: ");
14 scanf("%d%d", &a, &b);
15 return a+b;
16 }
```

outputs

```
Enter two numbers: 33 5
The Sum is 38
```



Run



Debug



Stop



Share



Save



{ } Beautify



main.c

```
1  /* Finding Factorial - Example for Function */
2  #include<stdio.h>
3  int fact(int);
4  int main()
5  {
6  int n;
7  printf("\nEnter a number: ");
8  scanf("%d", &n);
9  printf("The Factorial is %d", fact(n));
10 return 0;
11 }
12 int fact (int num)
13 {
14 int f=1, i;
15 for(i = num; i>0; i--)
16 f = f * i;
17 return f;
18 }
```

$$n! = n \times (n - 1) \times \dots \times 1$$

$$4! = 4 \times 3 \times 2 \times 1 = 24$$

outputs

```
Enter a number: 4
The Factorial is 24
```

```

1  #include<stdio.h>
2  void show (int i)
3  {
4  int n=0;
5  n=n+i;
6  printf("%d\t", ++n);
7  }
8  int main()
9  {
10 for( int i =0;i<5;i++ )
11 show(i);
12 return 0;
13 }
14

```

outputs

```

1      2      3      4      5

```

```

1  //Example for static variable
2  #include<stdio.h>
3  void show (int i)
4  {
5  int static n=0;
6  n=n+i;
7  printf("%d\t", ++n);
8  }
9  int main()
10 {
11 for( int i =0;i<5;i++ )
12 show(i);
13 return 0;
14 }

```

outputs

```

1      3      6      10     15

```

```
#include <stdio.h>
int addNumbers(int a, int b);           // function prototype

int main()
{
    int n1,n2,sum;

    printf("Enters two numbers: ");
    scanf("%d %d",&n1,&n2);

    sum = addNumbers(n1, n2);           // function call
    printf("sum = %d",sum);

    return 0;
}

int addNumbers(int a, int b)           // function definition
{
    int result;
    result = a+b;
    return result;                       // return statement
}
```



[https://www.onlinegdb.com/online c compiler#](https://www.onlinegdb.com/online_c_compiler#)

**Lab Exercise pp 183-191**