05/02/2023

Functions: are the code block which perform some well defined task acc. to user preference to attain some output.

i.e

return-type fun Name ( ) {
    Body (performing task)
}

→ parenthesis
↓ input parameters

* Function are more readable
* can be re-use & refer.

ex: void printName ( ) {

↳ Function Name should be understandable

void returntype i.e NULL won't return anything

} code

→ **Argument:** The value / input that is passed to the function when function is called.
said to be argument
↳ also known as Actual Parameter

→ **Parameter:** The value / input that are associated with the definition of func. said to be Parameter.
↳ also known as Formal Parameter.

Parameter ~~Argument~~ are ~~global~~ local variable can be used to scope of that function.

* int main ( ) { → calling / complier execute the code from main func

↓ returntype

return 0; → indicates the successfully execution of code.

}

return 0 → indicates the successfully execution of code it did what it was meant to do.

return 1 : it will show error while executing code : didn't do the way to use main for

return -1 :

* Why to use functions ?
  - Not to create lengthy & bulky codes
  - Increase readability
  - Re-use or refer acc. to our preference.

* Function call stack :

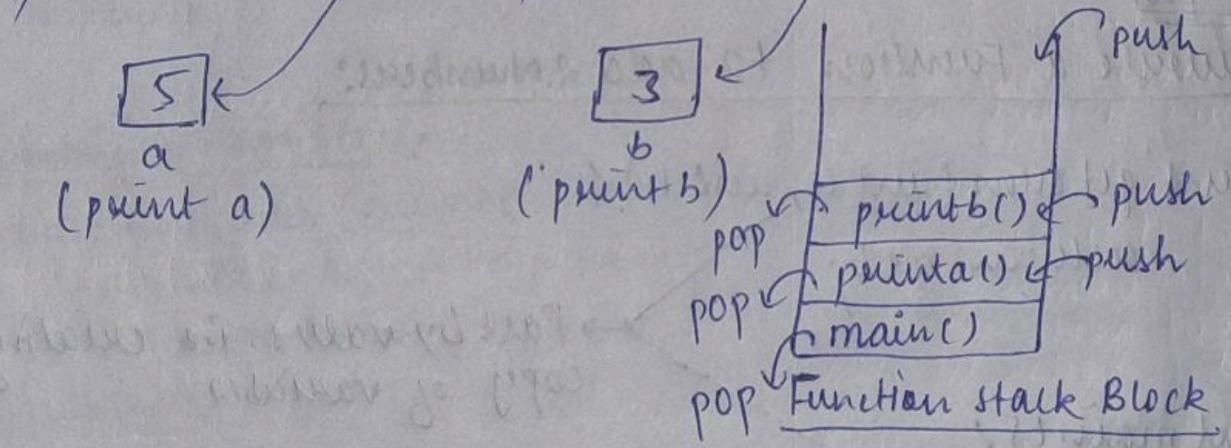
Stack : basically consists of push and pop of functions inside a bucket i.e FILO [First In Last Out]
↳ It is a Data structure.

ex :

```
int main(){
    int a=5;
    printa(a);
    return 0;
}

void printa(int a){
    int b=3;
    cout<<a;
    printb(b);
}

void printb(int b)
{
    cout<<b;
}
```



* Pass by value : Creating copy of any variable to the function parameter i.e making copy of variable declared inside main func and using that copy as a parameter to another function.

ex:

```
int main(){
    int num=12;
    num++;
    ++num;
    print(num)
    --num;
    cout<<num;
}
```

```
void print(num){
    ++num;
    num++;
    cout<<num;
    --num;
}
```

15 = ++num
16 = num++.

14
num

Here num = 16
i.e | 16 | num

--num = 16 - 1 = 15

~~12~~ i	~~13~~ = num++
num	14 = ++num

Now num stores value
i.e num = 14

for this --num it will take main function num value
i.e after updation | 14 | num

--num = 14 - 1 = 13

13
--num

This is an example of pass by value.

Examples

① Write a Function to add 2 Numbers:

```
int getSum(int a, int b){
    return a+b;
}
int main(){
    int a, b;
    cout<<"Enter value of a:"; cin>>a;
    cout<<"Enter value of b:"; cin>>b;
    int sum = getSum(a, b);
    cout<<"Sum of "<<a<<"and "<<b<<"is"<<sum;
    return 0;
}
```

→ Pass by value i.e creating copy of variable.

Output

Enter the value of a : 5
Enter the value of b : 8
Sum of 5 and 8 is 13.

(2) Find max of 3 Numbers

```
void getMaxOfThree(int x, int y, int z){
    if (x>y && x>z){
        cout<<x;
    }else if (y>z && y>x){
        cout<<y;
    }else{
        cout<<z;
    }

int main(){
    int num1, num2, int num3;
    cout<<"Enter num1 "; cin>>num1;
    cout<<"Enter num2 "; cin>>num2;
    cout<<"Enter num3 "; cin>>num3;
    getMaxOfThree(num1, num2, num3);

    return 0;
}
```

Output:

Enter num1 : 4
Enter num2 : 10
Enter num3 : 2
10

(3) counting from 1 to N:

```
void printSeries(int n){
    for(int i=1 ; i<=n ; i++){
        cout<<i<<" ";
    }

int main(){
    int num.
    cout<<"Enter the num"; cin>>num.
    printSeries(num);

    return 0;
}
```

Output:

n=10
1 2 3 4 5 6 7 8 9 10

④ Write a function of student's grade Problem:

```
char gradeCalc(int marks){
  switch(marks/10){
      case 10: return 'A'; break;
      case 9: return 'A'; break;
      case 8: return "B"; break;
      case 7: return "C"; break;
      case 6: return 'D'; break;
      default: return 'F';
  }
}
int main(){
 cout<<"Enter the marks:"; cin>>marks;
 char grade = gradeCalc(marks);
 cout<< grade;
 return 0;
}
```

output:

Enter the marks: 81

B

⑤ Sum of Even no upto N:

```
int evenSum(int number){
   int sum = 0;
   for(int i=2; i<=number; i+=2){
       sum = sum+i;
   }
   return sum;
}
int main(){
 cout<<"Enter the number:"; cin>>num;
 int sum = evenSum(num);
 cout<<sum;
 return 0;
}
```

output

Enter the number = 10

30

i.e 2+4+6+8+10 = 30

Extra

⑥ Write a function to display area of circle.

```
float areaOfCircle(int radius){
    return 3.14*radius*radius;
}
int main(){
    int radius;
    cout<<"Enter the radius:"; cin>>radius;
    float area = areaOfCircle(radius);
    cout<<"The area of circle having radius "<<radius<<" is "
        <<area;
    return 0;
}
```

Output

```
radius = 9
The area of circle having
radius 9 is 254.34.
```

⑦ Find num is Odd or Even :

```
void checkNum(int num){
    if(num%2==0){
        cout<<"Num is even";
    }
    else{
        cout<<"Num is Odd";
    }
}
int main(){
    int num;
    cout<<"Enter the num"; cin>>num;
    checkNum(num);
    return 0;
}
```

Output

```
Enter the Num: 28103
Num is Odd
enter the Num: 285688
Num is Even
```

⑧ Find factorial using function

```
int factorial(int number){
    int fact=1;
    for(int i=number; i>0; i--){
        fact=fact*i;
    }
    return fact;
}
int main(){
    int num;
    cout<<"Enter the num";
    cin>>num;
    int fact=factorial(num);
    cout<<fact;
    return 0;
}
```

Output

enter the num = 4

fact = 4

4 > 0 fact = 4

3 > 0 fact = 4 × 3 = 12

2 > 0 fact = 12 × 2 = 24

1 > 0 fact = 24 × 1 = 24

0 > 0 No **fact = 24**

(9) check Number is prime or not?

```
bool checkPrime (int n){
    bool prime = true;
    for (int i=2 ; i<=n-1; i++){
        if (n%i==0){
            prime = false;
            break;
        }
    }
    return prime;
}
int main(){
    int num;
    cout << "Enter the num :"; cin >> num;
    bool check = checkPrime (num);
    if(check){
        cout << "It is Prime ";
    }
    else{
        cout << "Not a Prime";
    }
    return 0;
}
```

Output:

Enter the num = 21
Not a prim,
Enter the num = 30
Not a prime
Enter the prime = 23
It is Prime.

(10) Print all prime numbers from 2 to N

```
bool checkPrime(int n){
    bool prime = true;
    if(n==0 || n==1){
        prime = false;
    }
    for(int i=2; i<=n-1; i++){
        if(n%i==0){
            prime = false;
            break;
        }
    }
    return prime;
}
int main(){
 cout<<"Enter the num:"; cin>>num;
 for(int i=1; i<=num; i++){
     bool check = checkPrime(i);
     if(check){
         cout<<i<<" ";
     }
 }return 0;
}
```

Output

Enter the num=10

2 3 5 7

Enter the num=20

2 3 5 7 11 13 17 19.