BATCH

RECURSION

C AND C++

PROGRAMMING MASTERCLASS

AWESH ISLAM
BUET, CSE

Class - 05

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https://www.hsccrackers.com/

SCAN ME

Increment & Decrement

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

int main() {
    int sum=5;
    sum=sum+1;
    sum+=1;
    sum++;
    sum--;
    sum-=1;
    sum=sum-1;
    printf("%d\n",sum);
    return 0;
}
```

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

int main() {
    int sum=5;
    printf("%d\n",++sum);
    printf("%d\n",sum);
    return 0;
}
```

Loop

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

int main() {
    for(int i=0;i<1000;i++){
        printf("%d Hello World!\n",i);
    }
    return 0;
}
```

```
for(initialize; check_condition; update)
        {
            //do this
            //this
            //and this
        }
```

BATCH RECURSION
Programming Course

For Loop

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

int main() {
    for(int i=0;i<1000;i++){
        printf("%d Hello World!\n",i);
    }
    return 0;
}
```

While Loop

```c
#include <stdio.h>
#include <math.h>
int main() {
    int n;
    scanf("%d",&n);
    int i=1;
    while(i<=n){
        printf("Hello World\n");
        i++;
    }
     return 0;
}
```

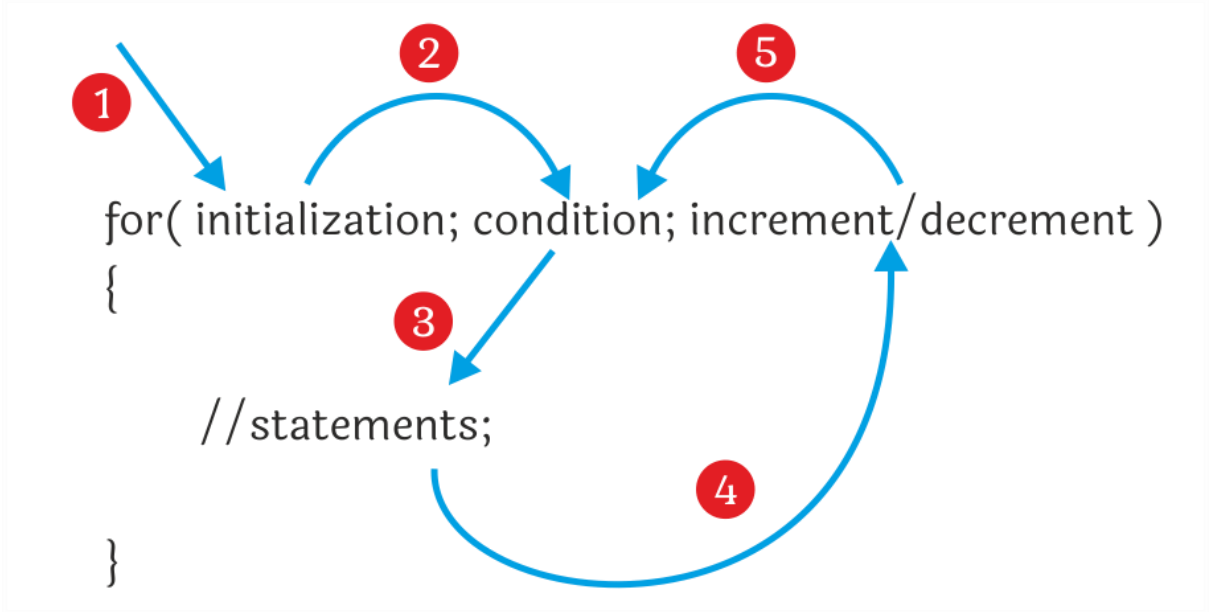
Do While Loop

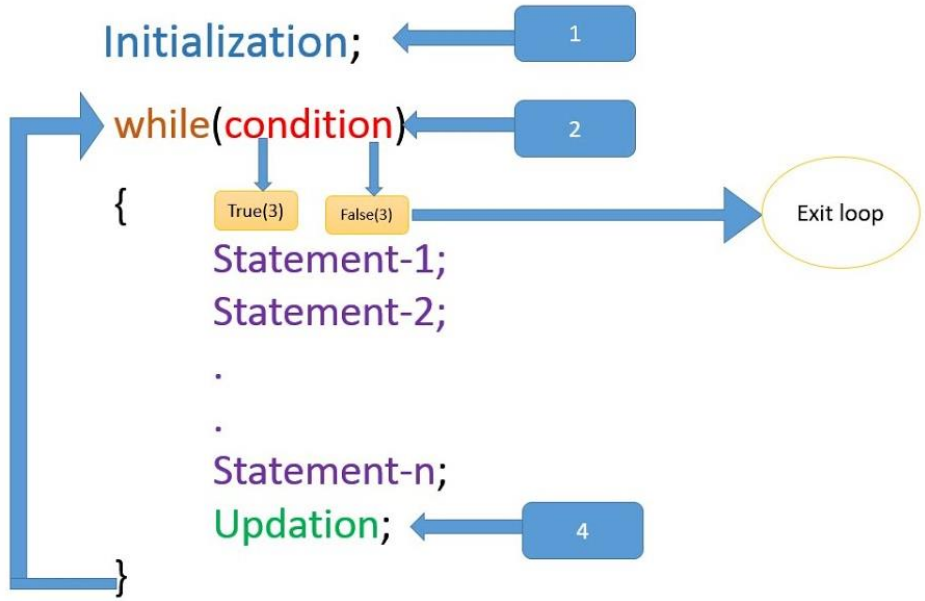
```c
#include <stdio.h>
#include <math.h>

int main() {
    int n;
    scanf("%d",&n);
    int i=1;
    do{
        printf("%d ",i);
        i++;
    }
    while(i<=n);
    return 0;
}
```

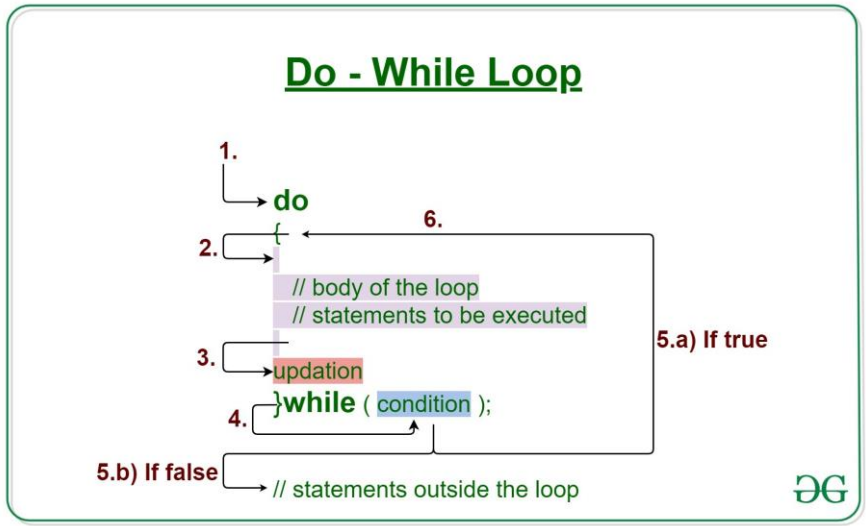
If Goto

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

int main() {
    int n;
    scanf("%d",&n);
    int i=1;
    again:
        {
        printf("Hello World\n");
        i++;
        }
    if(i<=n) goto again;
    return 0;
}
```

Loop







BATCH RECURSION

Practice Problem

Write a C Program to Convince someone in best way

Test Data :

Input : 3

Expected Output:

Sorry

Sorry

Sorry

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

int main() {
    for(int i=1;i<=1000;i++){
        printf("%d Sorry\n",i);
    }
    return 0;
}
```

```c
#include <stdio.h>
#include <math.h>
int main() {
    int n;
    scanf("%d",&n);
    int i=1;
    while(i<=n){
        printf("Hello World\n");
        i++;
    }
     return 0;
}
```

```c
#include <stdio.h>
#include <math.h>
int main() {
    int n;
    scanf("%d",&n);
    int i=1;
    do{
        printf("Hello World\n");
        i++;
    }
    while(i<=n);
     return 0;
}
```

Practice Problem

Write a C Program to print 1 2 3 …… n terms

Test Data :
Input : 3
Expected Output:
1 2 3

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

int main() {
    int n;
    scanf("%d",&n);
    for(int i=1;i<=n;i++){
        printf("%d ",i);
    }
    return 0;
}
```

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

int main() {
    int n;
    scanf("%d",&n);
    int i=1;
    while(i<=n){
        printf("%d ",i);
        i++;
    }
    return 0;
}
```

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

int main() {
    int n;
    scanf("%d",&n);
    int i=1;
    do{
        printf("%d ",i);
        i++;
    }
    while(i<=n);
    return 0;
}
```

Practice Problem

Input n;

Practice Problem

Write a C Program to print 1+2+3+4+5 series up to n terms

Test Data :
Input : 3
Expected Output:
1+2+3

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

int main() {
    int n;
    scanf("%d",&n);
    for(int i=1;i<=n;i++){
        if(i!=n) {
            printf("%d+",i);
        }
        else {
            printf("%d",i);
        }
    }
    return 0;
}
```

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

int main() {
    int n;
    scanf("%d",&n);
    int i=1;
    while(i<=n){
        if(i!=n) {
            printf("%d+",i);
        }
        else {
            printf("%d",i);
        }
        i++;
    }
    return 0;
}
```

Practice Problem

Write a C Program calculate the sum of n natural number . (1+2+3+4+5 = 15)

Test Data :
Input : 100
Expected Output:
5050

```c
#include <stdio.h>
int main() {
    int n;
    scanf("%d",&n);
    int sum=0;
    for(int i=1;i<=n;i++){
        sum=sum+i;
    }
    printf("%d",sum);
    return 0;
}
```

```c
#include <stdio.h>
int main() {
    int n;
    scanf("%d",&n);
    int sum=0;
    int i=1;
    while(i<=n){
        sum=sum+i;
        i++;
    }
    printf("%d",sum);
    return 0;
}
```

Practice Problem

Write a C Program calculate the sum of Even number upto n. (2+4+6 = 12)

Test Data :
Input : 3
Expected Output:
12

```c
#include <stdio.h>
int main() {
    int n;
    scanf("%d",&n);
    int sum=0;
    for(int i=2;i<=n;i+=2){
        sum=sum+i;
    }
    printf("%d",sum);
    return 0;
}
```

```c
#include <stdio.h>
int main() {
    int n;
    scanf("%d",&n);
    int sum=0;
    int i=2;
    while(i<=n){
        sum=sum+i;
        i+=2;
    }
    printf("%d",sum);
    return 0;
}
```

Practice Problem

Write a C Program calculate the sum of n Even number . (2+4+6 = 12)

Test Data :
Input : 3
Expected Output:
12

```c
#include <stdio.h>
int main() {
    int n;
    scanf("%d",&n);
    int sum=0;
    int temp=2;
    for(int i=1;i<=n;i++){
        sum=sum+temp;
        temp+=2;
    }
    printf("%d",sum);
    return 0;
}
```

Home Work

Write a C Program calculate the sum of n ODD number . (2+4+6 = 12)

Test Data :
Input : 3
Expected Output:
12

Practice Problem

Write a C Program to print 2,4,8,16,32,64 series up to n terms

Test Data :
Input : 5
Expected Output:
2,4,8,16,32

```c
#include <stdio.h>
#include <math.h>
int main() {
    int n;
    scanf("%d",&n);
    for(int i=1;i<=n;i++){
        int x=pow(2,i);
        printf("%d,",x);
    }
    return 0;
}
```

```c
#include <stdio.h>
#include <math.h>
int main() {
    int n;
    scanf("%d",&n);
    int temp=2;
    for(int i=1;i<=n;i++){
        printf("%d,",temp);
        temp*=2;
    }
    return 0;
}
```

Practice Problem

Write a C Program calculate the sum Given Series until nth term .
$(1^2 + 2^2 + 3^2 = 14)$

Test Data :
Input : 3
Expected Output:
14

```c
#include <stdio.h>
int main() {
    int n;
    scanf("%d",&n);
    int sum=0;
    for(int i=1;i<=n;i++){
        sum=sum+(i*i);
    }
    printf("%d",sum);
    return 0;
}
```

Practice Problem

Write a C Program calculate the sum Given Series until nth term .
$(1^1 + 2^2 + 3^3 = 14)$

Test Data :
Input : 3
Expected Output:
32

```c
#include <stdio.h>
#include <math.h>
int main() {
    int n;
    scanf("%d",&n);
    int sum=0;
    for(int i=1;i<=n;i++){
        sum=sum+pow(i,i);
    }
    printf("%d",sum);
    return 0;
}
```

Problem Solving

Write a C Program calculate the sum Given Series until nth term .
$(1^2 + 2^3 + 3^4 = 14)$

Test Data :
Input : 3
Expected Output:
32

```c
#include <stdio.h>
#include <math.h>
int main() {
    int n;
    scanf("%d",&n);
    int sum=0;
    for(int i=1;i<=n;i++){
        sum=sum+pow(i,i+1);
    }
    printf("%d",sum);
    return 0;
}
```

Problem Solving

Write a C Program calculate the sum Given Series until nth term .
$(2 + 4 + 8 + 16 = 30)$

Test Data :
Input : 4
Expected Output:
30

```c
#include <stdio.h>
#include <math.h>
int main() {
    int n;
    scanf("%d",&n);
    int sum=0;
    for(int i=1;i<=n;i++){
        sum=sum+pow(2,i);
    }
    printf("%d",sum);
    return 0;
}
```

Problem Solving

Take input of n different number and calculate the number of even and odd in those inputs.

Test Data :
Input :
5
4 3 5 1 6
Expected Output:
Even=2 and Odd=3

```c
#include <stdio.h>
#include <math.h>
int main() {
    int counteven=0;
    int countodd=0;
    for(int i=1;i<=5;i++){
        int x;
        scanf("%d",&x);
        if((x%2)==0){
            counteven++;
        }
        else {
            countodd=countodd+1;
        }
    }
    printf("Even = %d and Odd= %d",counteven,countodd);
    return 0;
}
```

Calculation of Factorial

```c
#include <stdio.h>
int main() {
    int n;
    scanf("%d",&n);
    int fact=1;
    for(int i=1;i<=n;i++){
        fact=fact*i;
    }
    printf("%d",fact);
    return 0;
}
```

Break & Continue

```c
#include <stdio.h>
#include <math.h>
int main() {
    for(int i=1;i<=10;i++){
        printf("%d\n",i);
        if(i==5) {
            break;
        }
    }
    return 0;
}
```

```c
#include <stdio.h>
#include <math.h>
int main() {
    for(int i=1;i<=10;i++){
        if(i==5) {
            continue;
        }
        printf("%d\n",i);
    }
    return 0;
}
```

How Many Digits on a Number

Check Beautiful Numbers

Tonmoy likes beautiful value . Beautiful numbers are made by the sum of its all integer's square value .Suppose if a number is 3204 then the beautiful value is $3^2 + 2^2 + 0^2 + 4^2 = 29$.Take a input of a integer and print the beautiful value .

Test Data 1:
Input : 3204
Expected Output:
Beautiful Value = 29

Test Data 2:
Input : 1001
Expected Output:
Beautiful Value = 2

Test Data 3:
Input : 9999
Expected Output:
Beautiful Value = 324

Check Prime Number

Variable Swaping

```c
#include <stdio.h>
int main() {
    int a;
    int b;
    scanf("%d %d",&a,&b);
    int temp=a;
    a=b;
    b=temp;
    return 0;
}
```

Fibonacci

Print this series : 0,1,1,2,3,5,8,13,21……..

Test Data :
Input : 6
Expected Output:
0,1,1,2,3,5,8

```c
#include <stdio.h>
int main() {
    int n;
    scanf("%d",&n);
    int a=0;
    int b=1;
    printf("%d,%d,",a,b);
    for(int i=1;i<=(n-2);i++){
        printf("%d,",a+b);
        int temp=b;
        b=a+b;
        a=temp;
    }
    return 0;
}
```

Home Work

গসাগু , লসাগু নির্ণয়

```c
#include <stdio.h>
int main() {
    int a,b;
    scanf("%d %d",&a,&b);//b>a
    while(1){
        int rem=b%a;
        if(rem==0) break;
        b=a;
        a=rem;
    }
    printf("GCD is = %d",a);
     return 0;
}
```

```c
#include <stdio.h>
int main() {
    int a,b;
    scanf("%d %d",&a,&b);//b>a
    int gcd;
    for(int i=a;i>=1;i--){
        if((b%i)==0 && (a%i)==0){
            gcd=i;
            break;
        }
    }
    printf("GCD is = %d",gcd);
     return 0;
}
```

Nested Loop

Nested Loop

Brain Teaser

Write a C Program to Print all the prime number between 1 to N

Input :
100
Expected Output:

2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97

Brain Teaser

Write a C Program to Print all the Armstrong number between 1 to N

An Armstrong number is one whose total sum of (digits raised to the power of its total digit equals the number itself).
153 is an armstrong number because here total digit is 3 so
Pow(1,3) + pow (5,3) + pow (3,3)= 153

Input :
N
Expected Output:

0, 1, 153, 370, 371,407, 1634, 8208 and 9474

You Can not User Log Functions