

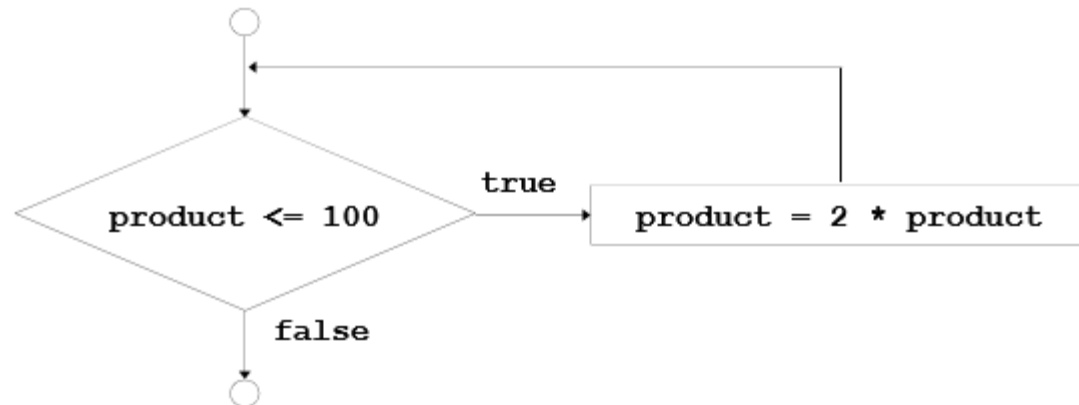
PROGRAMLAMAYA GİRİŞ

DERS 4

Döngüler – while döngüsü

- ▶ Bazı koşullar sağlandığında (true olduğunda), belli bir grup komut tekrar tekrar çalıştırılır. Böyle yapılara döngü denir.
- ▶ While döngüsü, koşul doğru olduğu sürece çalışır, koşul false olduğunda döngüden çıkarılır.

```
int product = 2;  
while ( product <= 100 )  
    product = 2 * product;
```



Örnek

10 kişilik bir sınıfta yapılan kısa sınav sonucunda, kullanıcı tarafından girilen notların ortalamasını bulan program.

```
#include <stdio.h>

int main()
{
    int counter, grade, total, average;

    /* initialization phase */
    total = 0;
    counter = 1;

    /* processing phase */
    while ( counter <= 10 ) {
        printf( "Enter grade: " );
        scanf( "%d", &grade );
        total = total + grade;
        counter = counter + 1;
    }

    /* termination phase */
    average = total / 10.0;
    printf( "Class average is %d\n", average );

    return 0;    /* indicate program ended successfully */
}
```

```
Enter grade: 98
Enter grade: 76
Enter grade: 71
Enter grade: 87
Enter grade: 83
Enter grade: 90
Enter grade: 57
Enter grade: 79
Enter grade: 82
Enter grade: 94
Class average is 81
```

Kullanıcı Kontrollü Döngüler

```
/* Class average program with sentinel-controlled repetition */
#include <stdio.h>
int main()
{
    float average;
    int counter, grade, total;

    /* initialization phase */
    total = 0;
    counter = 0;

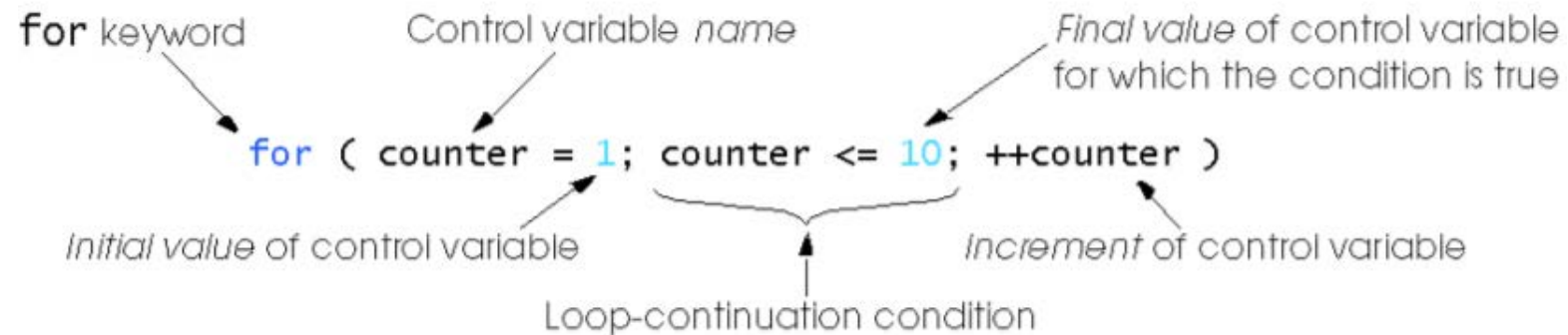
    /* processing phase */
    printf( "Enter grade, -1 to end: " );
    scanf( "%d", &grade );
    while ( grade != -1 )
    {
        total = total + grade;
        counter = counter + 1;
        printf( "Enter grade, -1 to end: " );
        scanf( "%d", &grade );
    }

    /* termination phase */
    if( counter != 0 ) {
        average = ( float ) total / counter;
        printf( "Class average is %.2f", average ); }
    else
        printf( "No grades were entered\n" );
    return 0; /* indicate program ended successfully */
}
```

```
Enter grade, -1 to end: 75
Enter grade, -1 to end: 94
Enter grade, -1 to end: 97
Enter grade, -1 to end: 88
Enter grade, -1 to end: 70
Enter grade, -1 to end: 64
Enter grade, -1 to end: 83
Enter grade, -1 to end: 89
Enter grade, -1 to end: -1
Class average is 82.50
```

for döngüsü

- Format when using `for` loops



- Example:

```
for(counter = 1; counter <= 10; counter++ ),  
    printf( "%d\n", counter );
```

- Prints the integers from one to ten

No
semicolon
(;) after for
statement

for döngüsü

- For loops can usually be rewritten as while loops:

```
initialization;  
while ( loopContinuationTest ) {  
    statement;  
    increment;  
}
```

- Initialization and increment

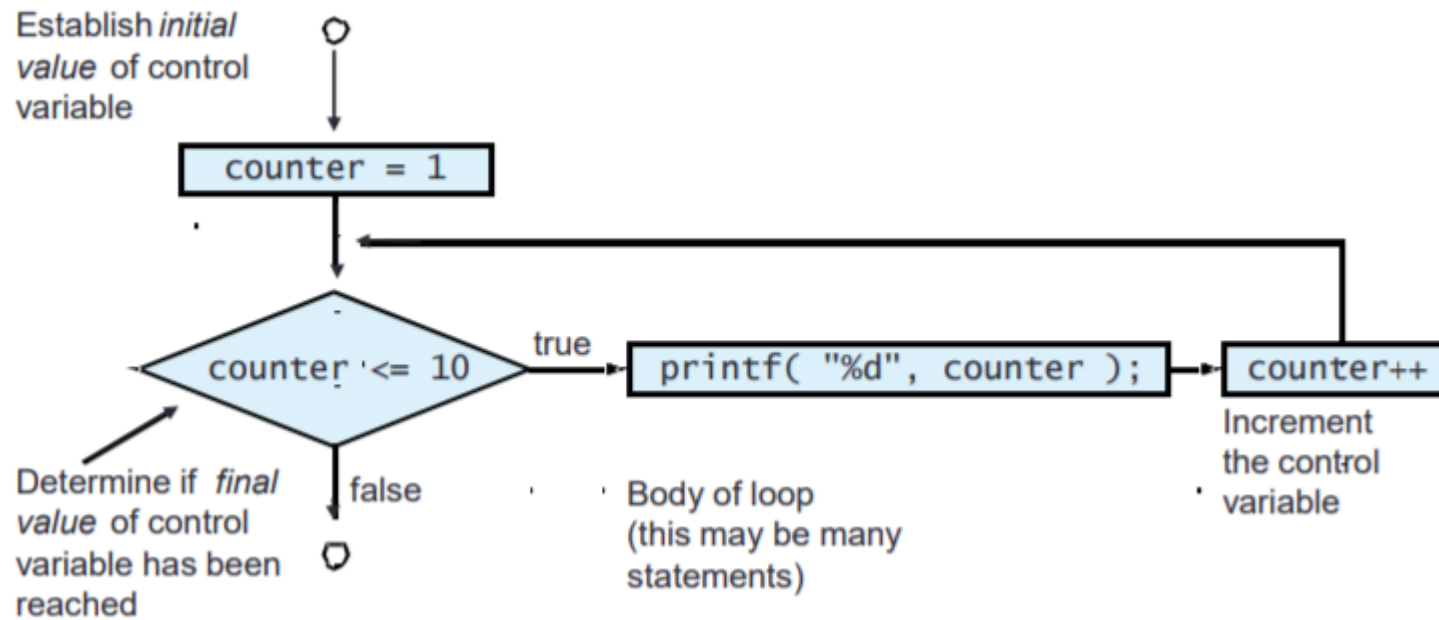
- Can be comma-separated lists

```
for ( i = 0, j = 0; j + i <= 10; j++, i++ )  
    printf( "%d\n", j + i );
```

- Initialization, loop-continuation, and increment can contain arithmetic expressions. If x equals 2 and y equals 10

```
for ( j = x; j <= 4 * x * y; j += y / x ) equals to  
for ( j = 2; j <= 80; j += 5 )
```

for döngüsü – Akış Şeması



for döngüsü - Örnek

Write a program that prints the sum of all numbers from 2 to 100

```
/*Summation with for */
#include <stdio.h>

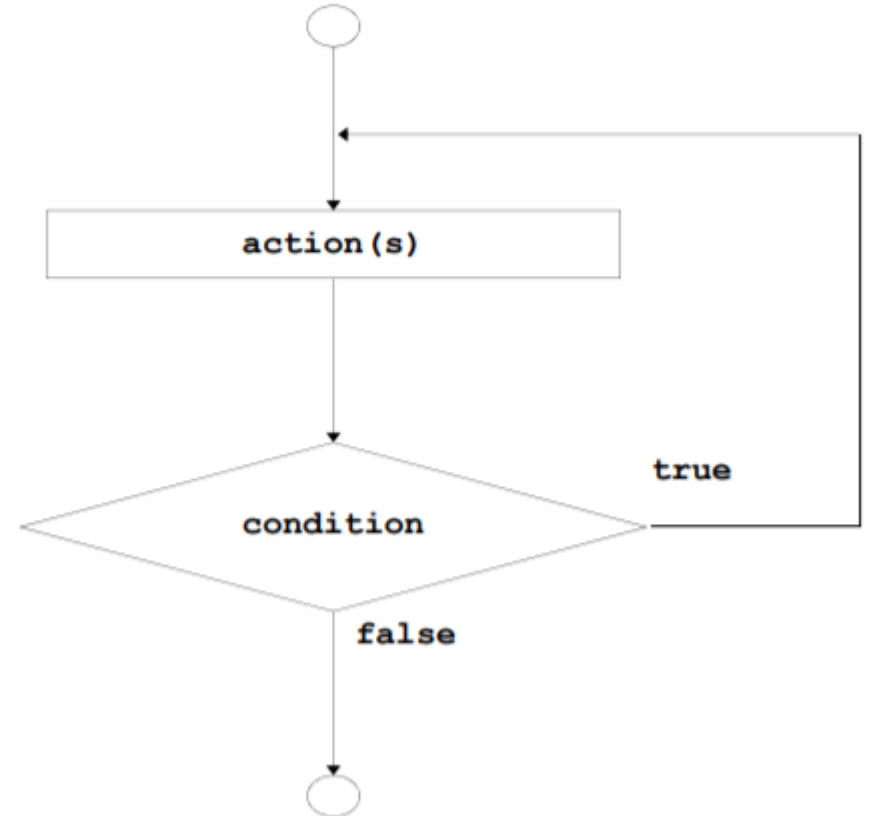
int main()
{
    int sum = 0, number;
    for ( number = 2; number <= 100; number += 1 )
        sum += number;
    printf( "Sum is %d\n", sum );
    return 0;
}
```

Sum is 2550

do/while döngüsü

- ▶ While döngüsüne çok benzer bir yapı
- ▶ Döngü içerisindeki komutlar en az 1 kere çalışır !!
- ▶ Format

```
do {  
    statement;  
} while ( condition );
```



do/while döngüsü Örnek

Prints the integers from one to ten

```
/*Using the do/while repetition structure */  
  
#include <stdio.h>  
int main()  
{  
    int counter = 1;  
  
    do {  
        printf( "%d ", counter );  
        counter = counter + 1;  
    } while ( counter <= 10 );  
  
    return 0;  
}
```

Döngüler - Örnek

- ▶ Üniversitede programlamaya giriş dersi için 10 öğrenci üzerinden bir anket yapılması planlanıyor. Her öğrencinin; eğer dersi geçtiyse 1, kaldıysa 2'yi tuşlaması isteniyor. Eğer dersten kalan öğrenci sayısı %80 ve üzeri ise dersi veren öğretim üyesine « Öğrenimi artırın !!! » mesajını veren programı yazınız.

```

#include <stdio.h>
int main()
{
    int passes = 0;
    int failures = 0;
    int student = 1;
    int result;

    while(student <= 10)
    {
        printf( "Enter result: 1(Pass), 2(Fail): " );
        scanf( "%d", &result);

        if(result == 1)
            passes++;
        else
            failures++;

        student = student + 1;
    }

    printf("Passed:%d\n", passes);
    printf("Failed:%d\n", failures );

    if(passes > 8)
        printf("Raise the tuition!");

    return 0;    /* indicate program ended successfully */
}

```

```

Enter Result (1=pass,2=fail): 1
Enter Result (1=pass,2=fail): 1
Enter Result (1=pass,2=fail): 1
Enter Result (1=pass,2=fail): 2
Enter Result (1=pass,2=fail): 1
Enter Result (1=pass,2=fail): 1
Enter Result (1=pass,2=fail): 1
Enter Result (1=pass,2=fail): 1
Enter Result (1=pass,2=fail): 1
Enter Result (1=pass,2=fail): 1

```

```

Passed 9
Failed 1
Raise tuition

```

İç içe Döngüler

```
value = 0;  
for (i=1; i<=10; i=i+1)  
    for (j=1; j<=5; j=j+1)  
        value = value + 1;
```

- How many times the inner loop is executed?

İÇ-İÇE DÖNGÜLER – ÖRNEK (ÜÇGEN ÇİZİMİ)

- Write a program to draw a triangle like the following:
(input: the number of lines)

```
*  
**  
***  
****  
*****
```

We can use a nested for-loop:

```
for (i=1; i<=num_lines; ++i)  
{  
    for (j=1; j<=i; ++j)  
        printf("*");  
    printf("\n");  
}
```

İÇ-İÇE DÖNGÜLER - ÖRNEK

```
int main()
{
    int num, count, total = 0;

    printf("Enter a value or a negative number to end: " );
    scanf("%d", &num );

    while( num >= 0 ) {
        for (count = 1; count <= num; count++)
            total = total + count;
        printf("%d %d", num, total);
        printf( "Enter a value or a negative number to end:");
        scanf( "%d", &num );
        total = 0;
    }
    return 0;
}
```

Bu program kullanıcı tarafından negatif sayı alana dek sayıları okur ve her okuduğu sayı ile 1-sayı arasındaki sayıları toplayarak ekrana yazar.

Örnek

```
#include <stdio.h>

int main()
{
    char grade;
    int aCount = 0, bCount = 0, cCount = 0,
        dCount = 0, eCount = 0 ;

    printf( "Enter the letter grades. Enter X to exit. \n" );

    while((grade = getchar()) != 'X')
    {
        switch ( grade ) {
            case 'A': ++aCount;
                       break;
            case 'B': ++bCount;
                       break;
            case 'C': ++cCount;
                       break;
            case 'D': ++dCount;
                       break;
            case 'F': ++fCount;
                       break;
            default:   /* catch all other characters */
                       printf( "Incorrect letter grade entered." );
                       printf( "Enter a new grade.\n" );
                       break;
        }
    }
}
```


Örnek-Devam

```
printf("Total for each letter grade are:\n" );  
printf("A: %d\n", aCount );  
printf("B: %d\n", bCount );  
printf("C: %d\n", cCount );  
printf("D: %d\n", dCount );  
printf("E: %d\n", eCount );  
printf("F: %d\n", gfCount );  
  
return 0;  
}
```

Sample Output:

Enter the letter grades. Enter X to exit.

A
B
C
C
A
F
C
E

Incorrect letter grade entered. Enter a new grade.

D
X

Totals for each letter grade are:

A: 2
B: 1
C: 3
D: 1
F: 1

break

- ▶ while, for do ... while veya switch yapılarından çıkılmasını sağlar.
- ▶ Program, yapıdan sonraki ilk komuta atlayarak çalışmasını sürdürür.

```
#include <stdio.h>

int main()
{
    int x;

    for(x = 1; x <= 10 ; x++)
    {
        if( x == 5) {
            break;
            printf("%d ", x);
        }

        printf("\nBroke out of the loop at x=%d ", x);
        return 0;
    }
}
```

```
1 2 3 4
Broke out of loop at x == 5
```

Örnek

```
/* 07prg06.c: n>=0 olduğu sürece n! değerini hesaplar */  
  
#include <stdio.h>  
  
int main()  
{  
    long int i,n,faktor;  
  
    while(1) /* sonsuz döngü */  
    {  
        printf("Faktoriyeli hesaplanacak sayi girin : ");  
        scanf("%ld",&n);  
  
        if(n<0) break; /* döngüyü sonlandır */  
  
        for(faktor=1, i=1; i<=n; i++)  
            faktor *= i;  
  
        printf("%ld! = %ld\n",n,faktor);  
    }  
  
    return 0;  
}
```

```
Faktoriyeli hesaplanacak sayi girin : 2  
2! = 2  
Faktoriyeli hesaplanacak sayi girin : 3  
3! = 6  
Faktoriyeli hesaplanacak sayi girin : 5  
5! = 120  
Faktoriyeli hesaplanacak sayi girin : 9  
9! = 362880  
Faktoriyeli hesaplanacak sayi girin : 0  
0! = 1  
Faktoriyeli hesaplanacak sayi girin : -4
```

continue

- ▶ While, for veya do ... while yapıları içindeki ifadeleri atlar.

```
#include <stdio.h>

int main()
{
    int x;

    for(x = 1; x <= 10 ; x++)
    {
        if( x == 5) {
            continue;
            printf("%d ", x);
        }

        printf("\nUsed continue to skip printing the value 5");
        return 0;
    }
}
```

```
1 2 3 4 6 7 8 9 10
Used continue to skip printing the value 5
```

Örnek

```
/* x, y'den farklı olmak üzere  $|x|+|y|\leq 3$  eşitsizliğini
sağlayan tamsayı çiftlerini ekrana yazar */

#include <stdio.h>

int main()
{
    int x,y,k=1;

    for (x=-3;x<=3;x++)
    for (y=-3;y<=3;y++)
    {
        /* x=y ise yeni çevrime gir, alt satırları atla */
        if(x==y) continue;

        if( abs(x)+abs(y)<=3 )
            printf("%2d. (%2d,%2d)\n",k++,x,y);
    }
    return 0;
}
```

```
1. (-3, 0)
2. (-2, -1)
3. (-2, 0)
4. (-2, 1)
5. (-1, -2)
6. (-1, 0)
7. (-1, 1)
8. (-1, 2)
9. ( 0, -3)
10. ( 0, -2)
11. ( 0, -1)
12. ( 0, 1)
13. ( 0, 2)
14. ( 0, 3)
15. ( 1, -2)
16. ( 1, -1)
17. ( 1, 0)
18. ( 1, 2)
19. ( 2, -1)
20. ( 2, 0)
21. ( 2, 1)
22. ( 3, 0)
```

Örnek

```
/*while döngüsü ile faktoryel hesaplar*/  
  
#include <stdio.h>  
  
int main() {  
    int number,factorial;  
    printf("Enter a number.\n");  
    scanf("%d",&number);  
    factorial=1;  
    while (number>0) {  
        /* while loop continues until test condition number>0 is true */  
        factorial=factorial*number;  
        --number;  
    }  
    printf("Factorial=%d",factorial);  
    return 0;  
}
```

Örnek

```
/* A-Z harflerini yazan for döngüsü. */  
  
#include <stdio.h>  
int main() {  
    char c;  
    for(c='A'; c<='Z'; ++c)  
        printf("%c ",c);  
    return 0;  
}
```