

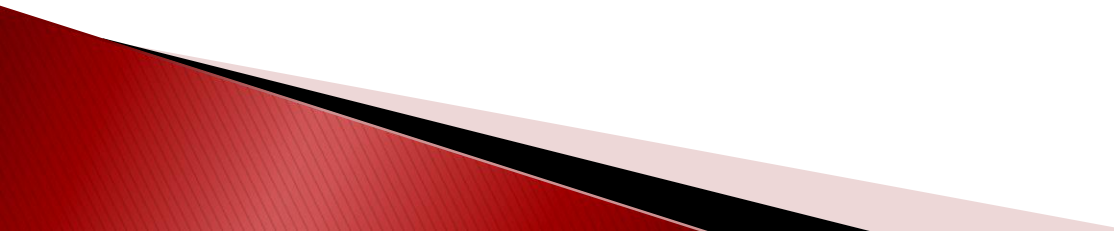
Introduction to Programming

Important Dates

▶ Midterm Test

- 21nd of October 2022 (Friday) - 2-4 pm, IK-201
- 21nd of October 2022 (Friday) - 4-6 pm, IK-201

REGISTER

- ▶ ID card / Students card
 - ▶ **Blue** ink pen
 - ▶ C reference sheet
- 

Revision – Practice

- ▶ Convert the following different base representations to **decimal** form:
 - 3415.482_9
 - $1C3B.2F_{16}$

Revision

- ▶ Convert the following ten base representation to **six** base form:
 - 1325.72_{10}
- ▶ Convert the following ten base representation to **nine** base form:
 - 1251.23_{10}

Revision

- ▶ Convert the following binary representation to hexadecimal form, and the hexadecimal representation to binary form:
 - 111111010101101010011_2
 - $75DA94C_{16}$
- ▶ Convert the following binary representation to octal form, and the octal representation to binary form:
 - 111110010101100010011_2
 - 6234745_8

Revision

What is the result of this code?

```
int a, b;  
a=024;  
b=0x3B;  
a= a | b;  
printf("b=%X, a=%d\n", b, a);
```

Revision

What is the result of this code?

```
int b, d;  
d=0x84;  
b=0x3D;  
b ^= (1 << 3);  
d &= (5 << 5);  
printf(" b=%X, d=%X\n", b, d);
```

Revision

What is the result of this code?

```
int n=11;  
printf("Result= %d\n", !(n & (1 << 3)));
```


Revision

What is the result of this code?

```
int i=-5, j=0, k=10;  
    if (k || i && j)  
        { i++;  
          j+=k; }  
    else  
        k=k*(i+j);  
    printf("i=%d\tj=%d\tk=%d\n",i,j,k);
```

Revision

What is the result of this code?

Work with the newly calculated values!!!

```
int a, b, c;  
a = b = c = 9;  
b = ++b + (a/5);  
c = c < a ? a+2 : b%5;  
b+=a; a%=2; --c;
```

Revision

What is the result of this code?

```
double a=15.123, b=-42.23123, c;  
    c=a;  
    a=b;  
    b=c;  
printf("a= %.3lf\nb=%.2lf\n", a, b);
```

Revision

What is the result of this code?

```
double a=5.12, b=42.23;  
    a-=b;  
    b+=a;  
    a=b-a;  
printf("a= %.4lf\nb=%.2lf\n",a,b);
```

Revision

What is the result of this code?

```
i=1; j=2; k=3; k-=+i-j--;
```

```
i=1; j=2; k=3; k+=--i+--j;
```

```
i=1; j=2; k=3; k=-i++-j--;
```

```
i=1; j=2; k=3; k*=i+j--;
```

```
i=1; j=2; k=3; k%=--i+j++;
```

Revision

What is the result of this code?

```
int i, j, k;  
i=-2; j=-3; k=0;  
If (i==j || k)  
    k=-1 * (++i || j);  
else  
    k=-2 * (i && k);  
printf("%d\n%d\n%d\n", i, j, k);
```

Revision

What is the result of this code?

```
int a, b;  
a=0x48;  
b=035;  
a= a | b;  
printf("b=%d, a=%X\n", b, a);
```

Revision

What is the result of this code?

```
int a, b, c;  
a= 0xEB; b =0xAC; c=0xEB;  
  
c &= b<<3;  
b ^= a>>1;  
  
printf("c=%o b=%X\n", c, b);
```


Revision

What is the result of this code?

```
int i;  
for(i=20; i>5; i--)  
    printf("%d ",i);
```

Revision

What is the result of this code?

```
int i;  
for(i=20; i>0; i=i-2)  
    printf("%d ",i);
```

Revision

What is the result of this code?

```
int i;  
for(i=20; i>5; i--);  
printf("%d ",i);
```

Revision

What is the result of this code?

```
int i=24;  
while (!i)  
    i--;  
printf("%d\n",i+4);
```

Revision

What is the result of this code?

```
int i=7;  
while (i==9)  
    i++;  
printf("%d\n",i+4);
```

Revision

What is the result of this code?

```
int i=7;  
while (i=9)  
    i++;  
printf("%d\n",i);
```

Revision

What is the result of this code?

```
int i=7;  
while (i=0)  
    i++;  
printf("%d\n",i+3);
```

Revision

What is the result of this code?

```
int i;  
for (i=1; i!=20; i+=2)  
    printf ("%d\n",i);
```


Revision

What is the result of this code?

```
int i=5;  
for ( ; i!=20; i++)  
    printf ("%d\n",i);
```

Revision

What is the result of this code?

```
int n, k, i, x;
scanf("%d", &n);
k = 0;
i = 1;
while (i <= n)
{
    scanf("%d", &x);
    if (x%2==0)
        k++;
    i++;
}
printf("%d", k);
```

Revision

What is the result of this code?

```
int a, sum=0;
for (a=1; a<10; a++){
    if(!(a%2)){
        printf("%d ", a);
        sum=sum+a;
    }
}
printf("\nSum = %d\n",sum);
```

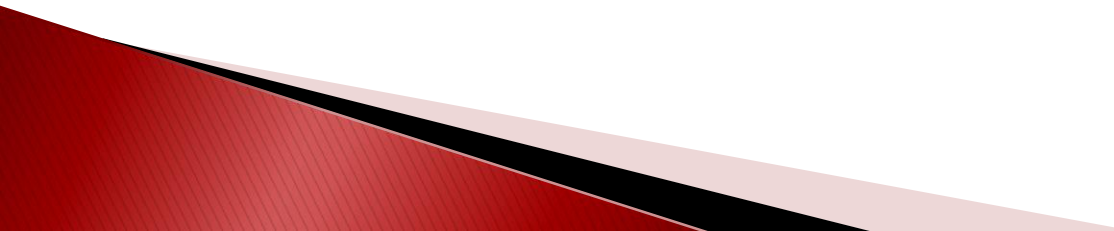
Revision

Rewrite the code again using do while, and the result be the same.

```
int x, k = 0;
scanf("%d", &x);
while(x!=0)
{
    scanf("%d", &x);
    k++;
}
printf("%d", k);
```

Solution

```
int x, k = 0;  
do  
{  
    scanf("%d", &x);  
    k++;  
} while(x!=0);  
  
printf("%d", k-1);
```



Revision

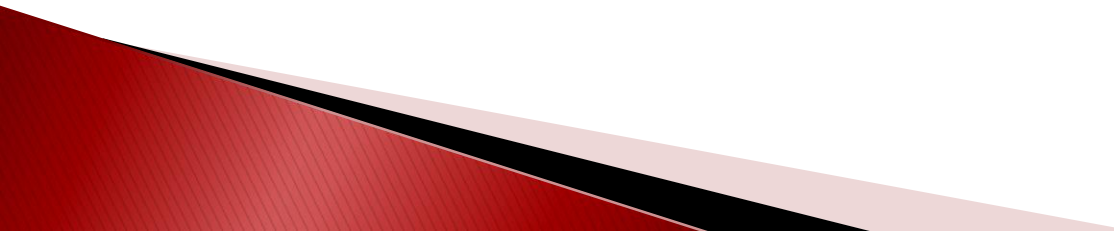
Find the mistakes!

```
#include <stdio>
int main
{
    int n;
    print(n=);
    scanf("%d",n);
    for(i=0;;i++);
        if (i=10) break;
        printf("%d", i, i*i);
    return 0;
}
```

Solution

```
#include <stdio.h>
int main()
{
    int n, i;
    printf("n=");
    scanf("%d",&n);
    for(i=0;;i++);
    {
        if (i==10)
            break;
        printf("%d %d", i, i*i);
    }
    return 0;
}
```

Arrays

- ▶ a data structure, which provides the facility to store a collection of data of same type under single variable name
 - ▶ the size should be an individual constant
 - ▶ the index specifies the location of the element in the array
 - ▶ the array index starts from zero
 - ▶ the maximum index value will be equal to the size of the array minus one
- 

One dimensional array

- ▶ declaration form of one-dimensional array is:

data_type array_name[size];

- ▶ **int a[5];**
a[0] = 1; // set first element
a[4] = 5; // set last element

One dimensional array

Examples:

```
int a[10];  
float b[20];  
char c[100];
```

► Initialization:

```
int a[10]={1,2,3,4,5,6,7,8,9,10};  
float f[100]={3.14, -12, 45};  
int b[50]={0};
```

Exercise

- ▶ Write a program to input n different integer numbers into an array, named a .
- ▶ After all numbers are input, display the numbers.

Solution

- ▶ Input/Output one dimensional array

```
int i, n;  
printf("n=");  
scanf("%d", &n);  
int a[n];  
for (i=0; i<n; i++)  
{  
    printf("a[%d]=", i);  
    scanf("%d", &a[i]);  
}  
for (i=0; i<n; i++)  
    printf("%d  ", a[i]);
```

Exercise

What is the result of this code?

```
int a[8] = { 12, 24, 11, 7, 4, 13, 18, 52 };  
int b[8] = { 2, 44, 21, 17, 24, 3, 38, 11 };  
int c[8], d[8], i;
```

```
for (i = 0; i < 8; i++)  
    c[i] = a[i] + b[i];
```

```
for (i = 0; i < 8; i++)  
    d[i] = c[i];
```

```
for (i = 0; i < 8; i++)  
    printf("%d, ", d[i]);
```

Exercise

What is the result of this code?

```
int B[40], i;  
for (i=0 ; i < 30; i++)  
    B[i] = 2*i+2;  
printf("%d %d\n", B[2], B[i-12]);
```

Exercise

What is the result of this code?

```
int B[25], i;  
for ( i=0; i < 15; i++ )  
    B[i] = 4*(2*i+1);  
printf("%d  %d\n", B[11], B[i-7]);
```

Exercise

What is the result of this code?

```
int B[50], i;  
for (i=0; i < 34; i++ )  
    B[i] = 3*i+2;  
printf("%d  %d\n", B[44], B[i-12]);
```


Exercise

What is the result of this code?

```
int B[40], i;  
for (i=0; i <= 27; i++ )  
    B[i] = 2*i+2;  
printf("%d  %d\n", B[7], B[i-18]);
```

Exercise – Homework

- ▶ Generate randomly n natural numbers within a and b interval $[a,b]$.
- ▶ Calculate the followings:
 - sum of the elements
 - count the even elements
 - define the minimum element
 - define the index of the minimum element
 - define the maximum element
 - define the index of the maximum element
- **Help:** store the randomly generated numbers in a one dimensional array:
 - `srand(time(NULL));`
 - `array[i]=(rand()%(b-a+1))+a;`