

ΕΠΛ 033: ΕΙΣΑΓΩΓΗ ΣΤΟΝ ΠΡΟΓΡΑΜΜΑΤΙΣΜΟ ΓΙΑ ΜΗΧΑΝΙΚΟΥΣ

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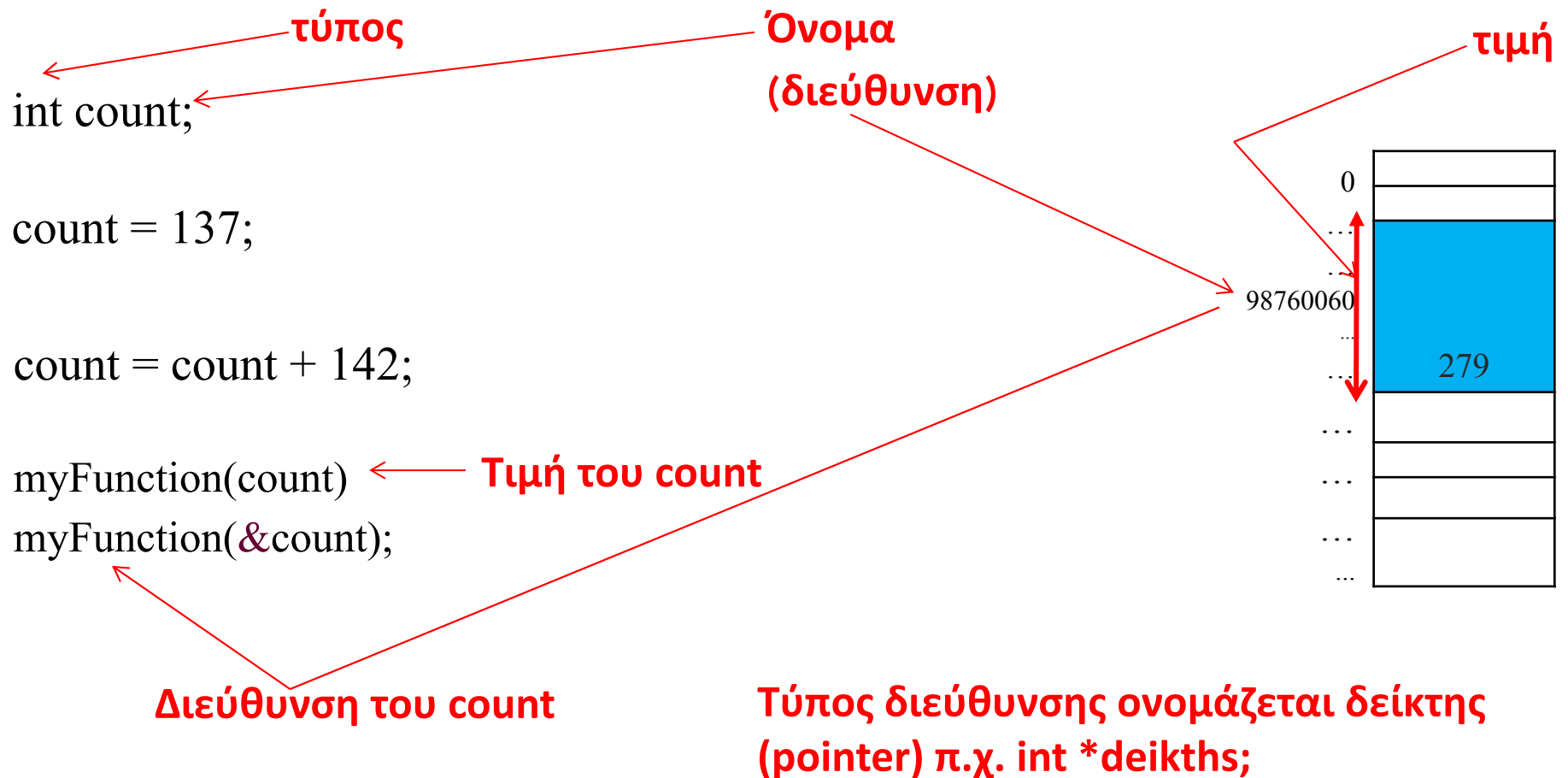
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ΔΕΙΚΤΕΣ (POINTERS)

Σημασία Μεταβλητής (συν.)



Χρησιμοποίηση Δεικτών (pointers)

3

```
#include <stdio.h>
int main ()
{
    int var = 20; /* actual variable declaration */
    int *ip; /* pointer variable declaration */

    ip = &var;

    /* store address of var in pointer variable*/
    printf("Address of var variable: %x\n", &var );

    /* address stored in pointer variable */
    printf("Address stored in ip variable: %x\n", ip );

    /* access the value using the pointer */
    printf("Value of *ip variable: %d\n", *ip );

    return 0;
}
```

```
Address of var variable: 28ff44
Address stored in ip variable: 28ff44
Value of *ip variable: 20
-
```

Προσαύξηση Δείκτη

4

```
#include <stdio.h>
const int MAX = 3;
int main ()
{
    int var[] = {10, 100, 200};
    int i, *ptr;

    /* let us have array address in pointer */
    ptr = var;
    for ( i = 0; i < MAX; i++)
    {
        printf("Address of var[%d] = %x\n", i, ptr );
        printf("Value of var[%d] = %d\n", i, *ptr );

        /* move to the next location */
        ptr++;
    }
    return 0;
}
```

```
Address of var[0] = 28ff30
Value of var[0] = 10
Address of var[1] = 28ff34
Value of var[1] = 100
Address of var[2] = 28ff38
Value of var[2] = 200
```

Μείωση Δείκτη

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```
#include <stdio.h>
const int MAX = 3;
int main ()
{
    int var[] = {10, 100, 200};
    int i, *ptr;
    /* let us have array address in pointer */
    ptr = &var[MAX-1];
    for ( i = MAX-1; i >= 0; i--)
    {
        printf("Address of var[%d] = %x\n", i, ptr );
        printf("Value of var[%d] = %d\n", i, *ptr );

        /* move to the previous location */
        ptr--;
    }
    return 0;
}
```

```
Address of var[2] = 22fe38
Value of var[2] = 200
Address of var[1] = 22fe34
Value of var[1] = 100
Address of var[0] = 22fe30
Value of var[0] = 10
```

Σύγκριση Δεικτών

6

```
#include <stdio.h>
const int MAX = 3;
int main ()
{
    int var[] = {10, 100, 200};
    int i, *ptr;

    /* let us have address of the first element in pointer */
    ptr = var;
    i = 0;

    while ( ptr <= &var[MAX - 1] )
    {
        printf("Address of var[%d] = %x\n", i, ptr );
        printf("Value of var[%d] = %d\n", i, *ptr );

        /* point to the next location */
        ptr++;
        i++;
    }

    return 0;
}
```

```
Address of var[0] = 28ff30
Value of var[0] = 10
Address of var[1] = 28ff34
Value of var[1] = 100
Address of var[2] = 28ff38
Value of var[2] = 200
```

Πίνακες Δεικτών

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```
#include <stdio.h>
const int MAX = 3;
int main ()
{
    int var[] = {10, 100, 200};
    int i;
    for (i = 0; i < MAX; i++)
    {
        printf("Value of var[%d] = %d\n", i, var[i] );
    }
    return 0;
}
```

```
Value of var[0] = 10
Value of var[1] = 100
Value of var[2] = 200
```

```
#include <stdio.h>
const int MAX = 3;
int main ()
{
    int var[] = {10, 100, 200};
    int i, *ptr[MAX];
    for ( i = 0; i < MAX; i++)
    {
        /* assign the address of integer. */
        ptr[i] = &var[i];
    }
    for ( i = 0; i < MAX; i++)
    {
        printf("Value of var[%d] = %d\n", i, *ptr[i] );
    }
    return 0;
}
```

```
Value of var[0] = 10
Value of var[1] = 100
Value of var[2] = 200
```


Πίνακες Δεικτών σε Χαρακτήρες – Αποθήκευση Συμβολοσειρών

8

```
#include <stdio.h>
const int MAX = 4;
```

```
int main ()
{
    char *names[] = { "Zara Ali",
                      "Hina Ali",
                      "Nuha Ali",
                      "Sara Ali",
                      };

    int i = 0;

    for ( i = 0; i < MAX; i++)
    {
        printf("Value of names[%d] = %s\n", i, names[i] );
    }

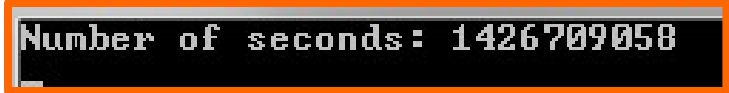
    return 0;
}
```

```
Value of names[0] = Zara Ali
Value of names[1] = Hina Ali
Value of names[2] = Nuha Ali
Value of names[3] = Sara Ali
```

Δείκτες και Συναρτήσεις

9

```
#include <stdio.h>
#include <time.h>
void getSeconds(unsigned long *par);
int main ()
{
    unsigned long sec;
    getSeconds( &sec );
    /* print the actual value */
    printf("Number of seconds: %ld\n", sec );
    return 0;
}
void getSeconds(unsigned long *par)
{
    /* get the current number of seconds */
    *par = time( NULL );
    return;
}
```



```
Number of seconds: 1426709050
```

Δείκτες και Συναρτήσεις

10

```
#include <stdio.h>
/* function declaration */
double getAverage(int *arr[], int size);
int main ()
{
    /* an int array with 5 elements */
    int balance[5] = {1000, 2, 3, 17, 50};
    double avg;
    /* pass pointer to the array as an argument */
    avg = getAverage( balance, 5 );
    /* output the returned value */
    printf("Average value is: %f\n", avg );
    return 0;
}
```

```
double getAverage(int *arr, int size)
{
    int i, sum = 0;
    double avg;
    for (i = 0; i < size; ++i)
    {
        sum += arr[i];
    }
    avg = (double)sum / size;
    return avg;
}
```

```
Average value is: 214.400000
```