



Sheet 8 (Pointers)

Class Work

- 1- Write a program that contains a function **Swap**, that gets two integers as parameters (call by reference), then swaps the values of these two numbers.
- 2- Define struct named "**Point**" that represents a point in the 2D space (representing the **x** and the **y** position in the X-Y plane).
 - a) Write a function that takes a point as a parameter (call by value), and returns its mirror value ($X_{new}=-x$, $Y_{new}=-y$).
Note: function should return a struct of type **Point**.
 - b) Write a function that takes a point as a parameter (call by reference), and returns its mirror value ($X_{new} = -x$, $Y_{new} = -y$).
Note: function type is void.
 - c) Write a program to use the above two functions

Home Work

- 1- Trace the following code:

```
#include <stdio.h>
void main (void )
{
    int a=2, b=3;
    int *z;

    z = &a ;
    a = b ;

    printf ( " value 1 = %d at address %p \n" , a , &a ) ;
    printf ( " value 2 = %d at address %p \n" , b , &b ) ;
    printf ( " value 3 = %d at address %p \n" , *z , z ) ;

}
```

2- Trace the following code:

```
#include <stdio.h>
void duplicate (int a, int *b, int *c)
{
    a=2;
    *b=2;
    *c=2;
}
void main (void)
{
    int x=1, y=3, z=7;

    duplicate ( x, &y, &z);
    printf ('x=%d \t y=%d \t z=%d \t', x , y , z );
}
```

3- Trace the following code:

```
#include <stdio.h>
void main (void )
{
    int a[] = {1, 2, 4, 6, 12, 3, 9};
    int *z;
    int i;

    z = a ;
    for( i = 0 ; i < 7; i++ )
    {
        printf ( " %d\n" , *z ) ;
        z++;
    }
}
```

4- Trace the following code:

```
#include <stdio.h>
void main (void )
{
    float table[] = { 1.1,2.3,4.5,6.7,8.7,6.6,4.0,3.3,2.7,4.5};
    float *pt, *qt;
    pt=table;
    *pt=0;
    qt=pt+2;
    *(pt+2)=3.14;
    printf(" %f %f %f %f", table[0] , table[2], *pt, *qt);
}
```

5- Trace the following code:

```
#include <stdio.h>
void main (void )
{
    int a[] = {1, 2, 4, 6, 12};
    char c[] = "Hello";
    int *z;
    char *x;
    int i;

    z = a;
    x = c;
    for( i =0 ; i < 5; i++ )
    {
        printf( " %d \t %c\n" , *z, *x ) ;
        *z++;
        x++;
    }
}
```

6- Trace the following code:

```
#include <stdio.h>

int SomeFunction(int *m)
{
    *m=(*m)+1;
    return(*m);
}
void main (void )
{
    int *a,b=1,c=2,d=3,*e;
    a=&d;
    e=&c;
    *a=1;
    printf("%d \t %d \t %d \n",*e, c, d);
    b=someFunction(&c);
    printf("%d \t %d \t %d \n", d, c, *e);
}
```