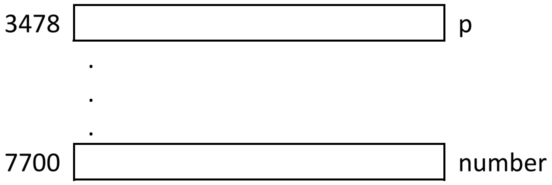
Tutorial 2 – Functions and Pointers

1. Assume the following declaration:

```
int number;
int *p;
```

Assume also that the address of number is 7700 and the address of p is 3478. That is,



For each case below, determine the value of

(a) number (b) &number (c) p (d) &p (e) *p

All of the results are cumulative.

(i) p = 100; number = 8
(ii) number = p
(iii) p = &number
(iv) *p = 10
(v) number = &p
(vi) p = &p

2. Find the error in each of the following program segments and explain how the error may be corrected.

(a)
```
int product(int m, int n)
{
int result;

        result =m * n;
}
```

(b)
```
int sumofSquare(int n)  /* assume n is non-negative */
{
   int sum = 0;

        if (n == 0)
                return 0;
        else
           for (j = 1; j <= n; j++)  sum += j * j ;
}
```

(c)
```
void  ft(float a)
{
     float a;

               printf(“%f\n”, a);
     }

(d)  void  height(float * h)
     {
               scanf(“%f”, &h);
     }

(e)  void  height(float * h)
     {
               scanf(“%f”, h);
               return *h;
     }

 (f) int divideBy4(int n)
     {
        int divideBy2(int m)
        {
                 return m/2;
         }

        return (divideBy2(divideBy2(n));
   }
```

3. What will be the output of the following program?

```
#include  <stdio.h>
void function0();
void function1(int h, int k);
void function2(int *h, int *k);
int main()
{
  int h, k;

     h = 5;
     k = 15;
     printf(“h = %d, k = %d\n”, h, k);  /* line (i) */
     function0();
     printf(“h = %d, k = %d\n”, h, k);  /* line (ii) */
     function1(h, k);
     printf(“h = %d, k = %d\n”, h, k);  /* line (iii) */
     function2(&h, &k);
     printf(“h = %d, k = %d\n”, h, k);  /* line (iv) */
     return 0;
}
void function0()
{
  int h, k;
```

```
    h = k = -100;
    printf(“h = %d, k = %d\n”, h, k);  /* line (v) */
}
void function1(int h, int k)
{
    printf(“h = %d, k = %d\n”, h, k);  /* line (vi) */
    h = k = 100;
    printf(“h = %d, k = %d\n”, h, k);  /* line (vii) */
}
void function2(int *h, int *k)
{
    printf(“h = %d, k = %d\n”, *h, *k);  /* line (viii) */
    *h = *k = 200;
    printf(“h = %d, k = %d\n”, *h, *k);  /* line (ix) */
}
```

4. **(calDistance)** Write a C program that accepts four decimal values representing the coordinates of two points, i.e. (x1, y1) and (x2, y2), on a plane, and calculates and displays the distance between the points:

$$\text{distance} = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

Your program should be implemented using functions. Provide two versions of the function for calculating the distance: (a) one uses call by value only for passing parameters; and (b) the other uses call by reference to pass the result to the calling function.