Homework Assignment 8

Part A (35%)

1. Declare a variable named myPointer as a pointer of type int, initializing the pointer to NULL in the declaration.

   Answer:

2. Write a statement that allocates memory for a new double value using the pointer variable newPointer.

   Answer:

3. Write a statement that resize the memory block pointed to by newPointer (in last question) to two times larger as the previous memory size.

   Answer:

4. Write a statement that deallocates memory for the pointer variable newPointer.

   Answer:

5. Given time1 is of type TimeHrMin defined earlier. What is the value of variable min after the following statements?

```
time1.hourValue  = 5;
time1.minuteValue = 4;
min = (60 * time1.hourValue) + time1.minuteValue;
```

   A. 301
   B. 302
   C. 303
   D. 304

6. What REALLY happens when you don't free after malloc?

7. What is difference between Structures and Union in C?

Part B (65%) Programming Exercises:

1. (35%) Below is a source code to show 4 students exam grades saved in a structure array. Copy the source code, compile it, and confirm the output by executing it.

```
#include <stdio.h>

struct student{
        char name[20];
        int eng;
        int math;
        int phys;
};

struct student data[]={
        {“Jack”, 82, 72, 78},
        {“Kim”, 87, 82, 89},
        {“Steve”, 92, 62, 79},
        {“Mark”, 80, 82, 88}
};

int main()
{
        int i;
        for(i=0; i<4; i++){
       printf(“%7s: Eng = %3d  Math = %3d   Phys = %3d\n”,
       data[i].name, data[i].eng, data[i].math, data[i].phys);
        }
        return (0);
}
```

The output should be

```
  Jack: Eng =  82  Math =  72   Phys =  78
   Kim: Eng =  87  Math =  82   Phys =  89
 Steve: Eng =  92  Math =  62   Phys =  79
  Mark: Eng =  80  Math =  82   Phys =  88
```

Write a program to calculate mean of three courses of each students.

a. The expected output:

```
  Jack: Eng =  82  Math =  72   Phys =  78: Mean =  77.3
   Kim: Eng =  87  Math =  82   Phys =  89: Mean =  86.0
 Steve: Eng =  92  Math =  62   Phys =  79: Mean =  77.7
  Mark: Eng =  80  Math =  82   Phys =  88: Mean =  83.3
```

2. (30%) Write a program in C to find the largest element using ***Dynamic Memory Allocation***.

   a. You can use either calloc or malloc function to allocate the memory for your input array
   b. Use pointer to reference the content of your input array.
   c. The expected output:

```
Input total number of elements (1 to 10): 5

Number 1: 1
Number 2: 2
Number 3: 3
Number 4: 4
Number 5: 5

The Largest element is: 5
```

Please reference the assignment submission guide on the iLearn for submission.