LAB EXERCISE 4

TOPIC: ARRAY

NAME: Yeoh Keng Wei
MATRIC NO: A24CS0316
SECTION: 05

1. Define the following arrays

   a) `heights`, 15 elements of type float.

      float heights[15];

   b) `ages`, 9 elements of type integer.
      int ages[9];

   c) `metrics`, 10 elements of type string.
      string metrics[10];

2. Given the definition of the array. Give reason why definition is not correct.

   a) `float points[6.5];`

      `Floating size in array is not allow.`

   b)
```
int sizeLimit;
int address[sizeLimit];
```

      `sizeLimit is variable but not constant.`

   c)
```
char category[-8];
negative value is not allow.
```

   d)
```
double length[];
Cannot declare array without size and initializer.
```

3. Write C++ statements to perform each of the following:

a) Declare an array named `tests` to allocate 5 elements of type double.
b) Show the memory allocations of the array named `tests`.
c) Read the value 25 from the keyboard and assign it into the array named `tests` of index 3.
d) Show the memory allocations of the array named `tests`.
e) Add the content of index 3 with the value 20 and assign the result into `tests [4]`.
f) Show the memory allocations of the array named `tests` after question (e).

```
#include <iostream>
using namespace std;

int main(){
    double tests[5];
    for(int i=0;i<5;i++){
        cout<<"tests["<<i<<"]:"<<tests[i]<<endl<<endl;
    }
    cout<<"Enter a value to store in tests[3]: ";
    cin>>tests[3];

    tests[4]=20+tests[3];

    for(int i=0;i<5;i++){
        cout<<endl<<"After input\n"<<"tests["<<i<<"]:"<<tests[i]<<endl;
    }
    return 0;

}
```

4. Given the following programs. Show the memory layout of the array and explain each statement.

```
1  //Program 5.1
2  #include <iostream>
3  using namespace std;
4
5  int main() {
6     const int SIZE = 4;
7     double score[SIZE];
8     int i;
9
10    cout << "Enter " << SIZE <<" of doubles: ";
11    for (i = 0; i < SIZE; i++)
12       cin >> score[i];
13    cout << "The scores are: \n";
14    for (i = 0; i < SIZE; i++)
15       cout <<score[i] << endl;
16    return 0;
17 }
```

(line 6&7) A constant size of 4 and the maximum value that can be store is 4 times in 'score'.
(line 10 to 12) user input value to store into score[0] until score[3] by using for loop.
(line 13 to 15) system will output the value that user have enter just now by looping and increment.

Memory Layout
Assume input value (1.1, 2.2, 3.3, 4.4)

Index	Value
score[0]	1.1
score[1]	2.2
score[2]	3.3
score[3]	4.4

5. Identify which of the following array declaration are invalid. If a declaration is invalid, explain your answer.

a) `int digits[8] = {2,4,5,3,5,1,8,0};`

   Valid

b) `int ids[5] = {101,202,303,404,505,606,707};`
   Invalid. Too many initialize.

c) `float length[] = {30.2,4.99,5.9};`
   Valid.

d) `int size[8] = {67, ,66, , , 99,39,67};`
   Invalid. Cannot have empty value in initialize list

e) `char feel[] = {'c', 'i', 'n', 't', 'a', '\0'};`
   Valid.

f) `char name[5] = "Azira";`
   Invalid. "Azira" have 5 letters and 1 null so need size of 6.

g) `char name[20] = "Sharifah Aini";`
   Valid.

6. Write a C++ program based on the following information, by using array (submit this question in .cpp file):

- Number of students = 10
- There are 10 marks of students to be saved

  Student 1: 70
  Student 2: 85
  Student 3: 57
  Student 4: 64
  Student 5: 83
  Student 6: 92
  Student 7: 75
  Student 8: 69
  Student 9: 95
  Student 10: 72

  Based on the above information, calculate the total of marks for all students, and then calculate its average.