LAB EXERCISE 4

TOPIC: ARRAY

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SECTION: 2

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];`
      Array size cannot have decimal value
   b) `int sizeLimit;`
      `int address[sizeLimit];`
      Array sizeLimit dosen't have the size of the array
   c) `char category[-8];`
      No negative value in array size
   d) `double length[];`
      No array size in length variable

3. Write C++ statements to perform each of the following:
   a) Declare an array named `tests` to allocate 5 elements of type double.
      double tests[5];
   b) Show the memory allocations of the array named `tests`.

tests[0]	tests[1]	tests[2]	tests[3]	tests[4]
First element	Second element	Third element	Forth element	Fifth element

   c) Read the value 25 from the keyboard and assign it into the array named `tests` of index 3.
      cin >> tests[3]
   d) Show the memory allocations of the array named `tests`.

tests[0]	tests[1]	tests[2]	25	tests[4]
First element	Second element	Third element	Forth element	Fifth element

   e) Add the content of index 3 with the value 20 and assign the result into `tests [4]`.
      tests[4]=tests[3]+20;
   f) Show the memory allocations of the array named `tests` after question (e).

tests[0]	tests[1]	tests[2]	25	45
First element	Second element	Third element	Forth element	Fifth element

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 }
```

score[0]	score[1]	score[2]	score[3]
First element	Second element	Third element	Forth element

Line 6: named constants used as size declarators
Line 7: declare an array named `score` of type double
Line 8: declare the counter of loops
Line 10: display to ask user enter the value
Line 11: for loop including initialize, condition and updates for counter
Line 12: user enter the score start based on that array element
Line 13: display the scores are
Line 14: for loop including initialize, condition and updates for counters
Line 15: display score based on that array element

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, because the initialization list already exist the array size
c) `float length[] = {30.2,4.99,5.9};`
   Valid
d) `int size[8] = {67, ,66, , , 99,39,67};`
   Invalid, because there cannot have empty value between the commas
e) `char feel[] = {'c', 'i', 'n', 't', 'a', '\0'};`
   Valid
f) `char name[5] = "Azira";`
   Invalid, because the name Azira have 6 elements including \0 but the array size only have 5
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.