LAB EXERCISE 4

TOPIC: ARRAY

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SECTION: 02

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];`

      subscript must be an integer number

   b) `int sizeLimit;`
      `int address[sizeLimit];`
      `sizeLimit not an integer expression.`

   c) `char category[-8];`
      subscript must be a positive integer number

   d) `double length[];`
      empty subscript, need to initialize

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`.

test[0]	test[1]	test[2]	test[3]	test[4]
First element	second element	third element	fourth 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`.

test[0]	test[1]	test[2]	25	test[4]

   e) Add the content of index 3 with the value 20 and assign the result into `tests [4]`.
      test[4]=test[3]+20;

   f) Show the memory allocations of the array named `tests` after question (e).

test[4]	test[4]	test[4]	25	45

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]

Row 6: declare a constant variable name SIZE and data type is integer
Row 7: declare an array name score containing 4 variables of type double
Row8: declare a variable name i and data type is integer
Row 10: prompt the output ask user to enter the value
Output : Enter 4 of doubles:
Row 11: use for loop with initialization: i =0; condition: i<SIZE; updating: i++
Row 12: user continue enter the value until the loop end
Row13: display the output
Output: The scores are:
Row14: use for loop with initialization: i =0; condition: i<SIZE; updating: i++
Row 15: continue display the value of array until the loop end

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, over size

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

   Valid

d) `int size[8] = {67, ,66, , , 99,39,67};`

   Invalid, cannot leave empty space

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

   Valid

f) `char name[5] = "Azira";`

   Invalid, because string "Azira" consists of 6 characters

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.