LAB EXERCISE 4

TOPIC: ARRAY

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SECTION:

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 need to be integer
b) int sizeLimit;   //it’s a variable. Need to use const int address[sizeLimit];
c) char category[-8];   //array size cant be negative
d) double length[];   //need to specify the array size or initialize the value

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.

```
- cout << "Memory allocations of array tests:" << endl;
  for (int i = 0; i < 5; ++i) {
        cout << "tests[" << i << "] address: " << &tests[i] << endl;
 }
```

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.

```
- cout << "Memory allocations of array tests:" << endl;
  for (int i = 0; i < 5; ++i) {
        cout << "tests[" << i << "] address: " << &tests[i] << endl;
 }
```

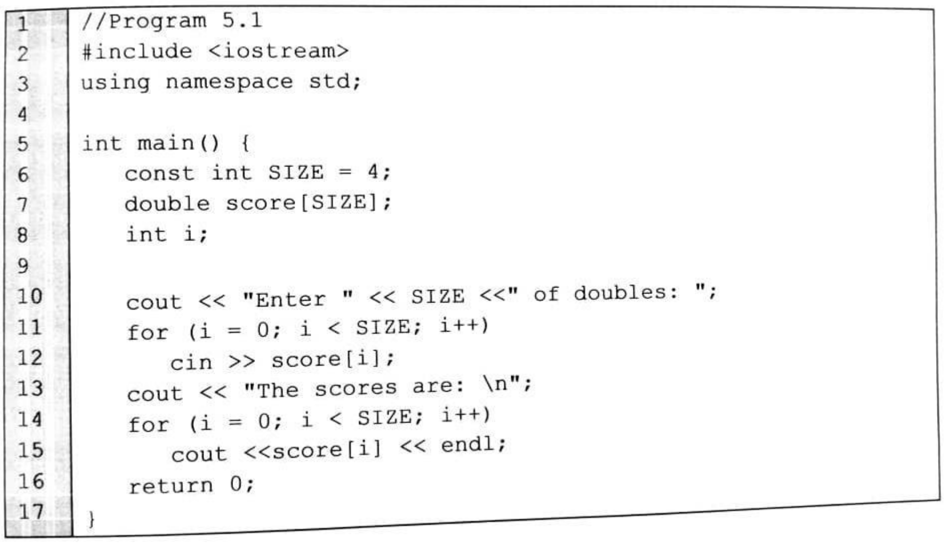
e) Add the content of index 3 with the value 20 and assign the result into tests [4].

- tests[4] = tests[3] + 20.0;

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

```
- cout << "Memory allocations of array after tests[4]:" << endl;
  for (int i = 0; i < 5; ++i) {
        cout << "tests[" << i << "] address: " << &tests[i] << endl;
 }
```

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



```
//Program 5.1
#include <iostream>
using namespace std;

int main() {
   const int SIZE = 4;
   double score[SIZE];
   int i;

   cout << "Enter " << SIZE <<" of doubles: ";
   for (i = 0; i < SIZE; i++)
      cin >> score[i];
   cout << "The scores are: \n";
   for (i = 0; i < SIZE; i++)
      cout <<score[i] << endl;
   return 0;
}
```

element	address	value
score[0]	0x1000	User input
score[1]	0x1008	User input
score[2]	0x1010	User input
score[3]	0x1018	User input

```
#include <iostream>  // include input-output library
using namespace std;

int main() {
    const int size = 4;  // declare a constant for array size
    double score[size];  // declare an array double with 4 element
    int i;  // declare a loop control variable

    cout << "enter " << size << " of doubles: ";  // ask user to input 4 double values
    for (i = 0; i < size; i++)  // loop through the array
        cin >> score[i];  // read input and store it in the array at index i

    cout << "the scores are: \n";  // show a message before printing the array values
    for (i = 0; i < size; i++)  // loop through the array
        cout << score[i] << endl;  // print each element of the array

    return 0;  // succesfully terminate program
}
```

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, declared for 5 elements but initialize 7 value`

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

d) `int size[8] = {67, ,66, , , 99,39,67};  //invalid, cannot have empty values`

e) `char feel[] = {‘c’, ‘i’, ‘n’, ‘t’, ‘a’, ‘\0’};  //valid`

f) `char name[5] = “Azira”; //invalid because azira has 5 letter but including null terminator it become 6. The array size is only 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.