LAB EXERCISE 4

TOPIC: ARRAY

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SECTION: 02

1. Define the following arrays

   a) `heights`, 15 elements of type float.
   b) `ages`, 9 elements of type integer.
   c) `metrics`, 10 elements of type string.

   a) float heights [15];
   b) int ages [9];
   c) std::string metrics [10];

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

   a) `float points[6.5];`
   b) `int sizeLimit;`
      `int address[sizeLimit];`
   c) `char category[-8];`
   d) `double length[];`

   a) The number in the bracket is supposed to be the size of the array and it's cannot be floating point.
   b) The sizelimit declared is supposed to be set a value for it to be used as a size of an array.
   c) The size of an array cannot be negative
   d) The size for the array is not declared/included.

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

(1st element, index 0) (2nd element, index 1) (3rd element, index 2) (4th element, index 3) (5th element, index 4)

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

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

```
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 }
```

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

0(score 1) 1(score 2) 2 (score 3) 3 (score 4)

score

score [0]	score [1]	score [2]	score [3]

const int SIZE = 4;

- this statement is to declare the size of an array and set it to 4.

double score[SIZE];

- this statement is to declare the score array and set the size of the array to the constant SIZE value which in this case is 4.

int i;

- this statement is to declare the index to be used in the next code section.

cout << “Enter “ << SIZE << “of doubles: “;

- this statement is to print out the instruction for user

for (i=0; i<SIZE; i++)

- this loop is to ensure that the program will keep asking the user to enter input until the maximum number of index is reached which in this case is 3.

cin >> score[i];

- this statement is to accept the input from user

cout << “The scores are: \n”;

- this statement is to print out the scores that the user have entered

cout << score[i] << endl;

- this statement is to print out the scores user have entered based on the index in different line

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 as the number of elements exceed the array size

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

- valid

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

- invalid as the element of an array cannot be separated by empty space

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

- valid

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

- valid

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.

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

int main(){
int NUM_STUDENTS = 10;
int marks [NUM_STUDENTS] = {70, 85, 57, 64, 83, 92, 75, 69, 95, 72};
double average, totalmark = 0;
int i = 0;

for (i = 0; i < NUM_STUDENTS; i++){
    cout << "Student" << (i+1) << ": " << marks[i] << endl;
}

for (i = 0 ; i < NUM_STUDENTS; i++){
    totalmark += marks [i];
}
average = totalmark/NUM_STUDENTS;

cout << endl;
cout << "Total marks of all students is " << totalmark << endl;
cout << "Average of students' mark is " << average << endl;

return 0;

}
```

```
Student1: 70
Student2: 85
Student3: 57
Student4: 64
Student5: 83
Student6: 92
Student7: 75
Student8: 69
Student9: 95
Student10: 72

Total marks of all students is 762
Average of students' mark is 76.2

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Process exited after 0.9275 seconds with return value 0
Press any key to continue . . .
```