TEE2101/TE2101 Programming Methodology

Laboratory Exercise (LAB-III)

Name:

Matriculation Number:

Date submission due: Tuesday 5 April 2022 (1 week from your lab day) VIA LumiNUS – "Lab 3 Student Submission Folder"

Grading: Your assignment will be graded out of 100 marks and the final weight of this assignment is 15%.

Please adhere to the guidelines.

Guidelines to be followed while writing Report and submission

1. Please prepare the report in **PDF format** only.
2. Sign the declaration form (attached in this template).
3. **Add THIS report file and your working C code into one folder**. Submit the folder as a compressed "**zip**" file.
   - For the code file, please submit your **.c file(s) only**, not the whole Visual Studio project folder (if you use MS. Visual Studio).
4. Submitted **zip file name** should be in the following format.
   - MATRICULATION_NUMBER_ASSIGNMENT3_NAME (First Name).zip
   - Example: A0066493U_ASSIGNMENT3_SEUNGMIN.zip
5. We do not mark your submission if the submission does not follow the above format.

You are expected to follow the guidelines given below. These also carry marks:

1. Use meaningful variable names while programming. It's a good practice to develop good programming skills and enables readability.
2. Explain the code with proper comments; Comments must be meaningful and descriptive.
3. Please adhere to the report deadlines and any late submissions are not accepted.
4. Please sign the declaration form (Page 2). We do not mark your submission if this form is not signed.

What you need to submit? - YOUR OUTPUT:

Paste the screenshot of your code and output.

Assignment Declaration Form

Please read sections A, B and C below. Sign and submit this declaration form together with your answers.

A. Academic, Professional and Personal Integrity

1. The University is committed to nurturing an environment conducive for the exchange of ideas, advancement of knowledge and intellectual development. Academic honesty and integrity are essential conditions for the pursuit and acquisition of knowledge, and the University expects each student to always maintain and uphold the highest standards of integrity and academic honesty.

2. The University takes a strict view of cheating in any form, deceptive fabrication, plagiarism and violation of intellectual property and copyright laws. Any student who is found to have engaged in such misconduct will be subject to disciplinary action by the University.

3. It is important to note that all students share the responsibility of protecting the academic standards and reputation of the University. This responsibility can extend beyond each student' s own conduct and can include reporting incidents of suspected academic dishonesty through the appropriate channels. Students who have reasonable grounds to suspect academic dishonesty should raise their concerns directly to the relevant Head of Department, Dean of Faculty, Registrar, Vice Provost or Provost.

B. I have read and understood the rules of the assessments stated below:

a. Students should attempt the assessments on their own. There should be no discussion or communication, via face to face or communication devices, with any other person during the assessment.

b. Students should not reproduce any assessment materials, e.g., by photograph y, videography, screenshots, copying down of questions, etc. Posting on public frums, e.g., social media and websites, is prohibited.

C. I understand that by breaching any of the rules above, I would have committed offences under clause 3(1) of the NUS Statute 6, Discipline with Respect to Students, which is punishable with disciplinary action under clause 10 or clause 11 of the said statute.

3) Any student who is alleged to have committed or attempted to commit, or caused or attempted to cause any other person to commit any of the following offences, may be subject to disciplinary proceedings:

(I) plagiarism, giving or receiving unauthorized assistance in academic work, or other forms of academic dishonesty.

I have read and will abide by the NUS Code of Student Conduct (in particular, (A) Academic, Professional and Personal Integrity), B and C when attempting this assessment.

Signature: _____ **Date:** 05/04/2022

Matric. No: ___A0245336E_____

NOTE: Start your answers from here. Use as much space as needed.

Q1.

i)

```
Generate array Signal A is:
1, 3, -10, 3, 3, 0, 7, 3, 1, -2, 0, 0, 0, -1, 0, 1, -4, 4, -3, -5, 5, -6, 7, 3, -5, 0, -3, 0, 8, 7, 5, 1, -1, -7, -2, -3, -6, 0, 8, 2, -2, 3, -3, 1, 6, -1, 4, 3, -1, 3, 0, -10, -2, 7, -1, 3, -2, -1, 5, 0, 1, 7, 5, -4, -2,
-1, -4, -9, 4, -2, -7, -2, 0, -1, -1, -1, -6, 3, 5, 3, 3, 3, 3, 2, 0, 2, -3, -2, -4, 4, 6, -1, -6, -2, 0, -1, 6, 2, 1, 5, -2,
```

ii)

```
Generate array Signal A is:
3, 5, -2, -3, 2, 2, -10, -4, 5, -7, 0, 4, 1, 3, -1, 2, 5, -4, -6, -9, -6, 4, -2, 1, 3, -3, 6, -5, 0, 0, 6, 8, 4, -3, 8, -2, 5, 3, -1, 1, 5, 8, 10, -3, 3, 2, -1, -2, 0, 1, -8, -3, 2, 8, -3, -5, 1, 6, -3, -2, 5, 7, -1, -1,
1, 8, 1, -5, -4, -3, -4, -10, 0, -3, 1, 1, 3, -2, 8, 2, 4, 7, -6, 2, -6, -1, 0, -9, 2, -1, 6, -9, 1, 3, -10, 3, 0, 3, 0, -1,
Generate array Signal B is:
2, 0, -7, 4, -10, 5, 0, -10, 2, 3, -2, -2, -1, -4, -1, -4, 6, 2, 0, 2, -4, -1, -4, 2, 1, 0, -7, 0, 0, -1, -5, 1, -3, 2, -4, 1, 1, 2, 3, 3, -9, 4, -5, -4, -4, -1, 8, 0, 0, -10, 0, -2, -1, -3, -3, 4, 1, 4, 3, -4, -3, 4, -
2, 1, 7, 1, -6, -1, 3, 2, 5, -9, 2, 1, 3, 3, 4, 0, 4, -6, 4, 1, -3, 4, 3, -3, 3, 3, 4, -2, 1, -7, 0, 4, 0, -3, 4, 0, 0, -4,

Signal A
maximum of array for signal is : 10
minimum of array for signal is : -10
indices of min is:6, 71, 94,
indices of max is:42,

Signal B
maximum of array for signal is : 8
minimum of array for signal is : -10
indices of min is:4, 7, 49,
indices of max is:46,
```

iii)

N=100

```
Generate array Signal A is:
9, -8, 7, -2, 5, -7, 4, 2, 2, 4, 2, 2, 4, -6, -8, 8, 1, 7, -4, -4, 4, 1, 2, -1, -8, 0, -5, 10, -1, 8, 5, 4, 2, 8, 4, 2, 0, -6, -5, 2, -2, 4, 2, -4, 3, -4, -10, -1, -8, 0, -3, -9, -7, 4, -8, -9, 8, 1, 2, 3, -2, 6, -3, 4, 1
, 7, 7, 6, 5, 7, 0, -4, -3, 6, -1, 2, 6, -1, 4, 1, -3, 8, 6, 2, -2, 0, -6, 7, -7, 1, -3, 1, -4, 5, -2, 7, 1, 2, 1, -3,
Generate array Signal B is:
4, -1, -3, 0, 2, -2, 10, 1, 3, -3, 7, -3, 6, 0, -1, 3, 1, -1, 3, -9, 4, -4, 7, 4, -1, -5, 0, -8, -2, 8, 1, 9, 0, 1, 3, 4, 3, 5, -3, -1, -5, -8, 8, -3, 3, -1, 10, 1, -2, -3, -1, 5, -1, -7, 5, 0, -2, -6, -3, -2, 2, 2, 5, -
4, 0, 0, -4, 2, 2, -7, 1, 1, 0, 0, -6, -2, -3, -3, -4, 0, 1, 6, 8, 0, -9, -5, -4, 1, 3, 2, 4, 0, -3, 7, 3, 4, -5, 7, -5, 5,

Signal A
maximum of array for signal is : 10
minimum of array for signal is : -10
indices of min is:46,
indices of max is:27,
Number of zero Count: 5

Signal B
maximum of array for signal is : 10
minimum of array for signal is : -9
indices of min is:19, 84,
indices of max is:6, 46,
Number of zero Count: 12

 Zero count different between A and B: -7
```

N = 200

```
Generate array Signal A is:
3, 6, 5, 7, 8, 0, -1, -1, -2, 6, 4, 4, -6, 4, -5, 2, 1, 4, -3, 6, -5, 5, 6, -6, 3, 0, -3, 0, 3, 2, 7, -2, 4, -5, 5, 7, 6, 6, 5, 3, 0, -1, 1, 1, -2, -1, -1, -6, 2, -4, 0, 0, 2, 7, -3, 5, 0, -5, -3, 0, 1, 0, 3, 2, -6, -2, 1, -
9, 1, 6, 2, 6, -1, -1, 2, 2, 6, 3, 3, -9, 2, -1, 2, 0, 0, 2, 7, 4, -3, 0, 4, 0, 7, -1, 2, 5, 2, -6, 6, -1, 8, 1, -1, 8, 1, 5, 6, -3, 5, 9, -4, -4, 2, 5, 5, 2, -3, 1, 5, 0, 2, -2, 3, 3, 5, 8, 8, -6, -6, 9, 0, 3, -9, -8, -3, -8
, -4, -1, -2, -1, -3, 0, 9, -7, -4, 5, -1, -9, 7, 3, -1, 2, -1, -1, -8, 1, 2, 7, -5, 0, 0, -2, -6, 1, 10, 1, 4, -3, -2, 4, -5, -3, -6, -4, -1, 5, -2, 2, -2, -2, 4, -2, 1, -4, -6, 1, -1, -8, 6, 4, -2, 1, 8, 1, 2, -1, -5
, 3, 10, 1,
Generate array Signal B is:
0, 3, -3, 5, -4, -2, 7, 8, 1, -1, -5, 4, 8, 5, 8, 8, -3, -2, 0, 2, -5, -8, 0, 6, -6, -7, 4, 3, 9, 1, -7, -1, 7, 7, -3, 1, 4, -8, -7, -1, 5, -1, 9, 6, -2, -4, 0, -4, -6, 1, -1, -1, 6, 9, -3, 1, 8, -3, 3, 1, 0, -7, 4, -3, -
2, 0, -6, -1, -2, 5, -6, 0, -2, -9, 2, 0, 6, -1, 6, -2, 6, -6, -3, 5, 4, -3, 4, -3, -3, 4, -1, -6, 7, 3, 1, -2, 0, -10, 5, -3, -3, -2, -7, 0, 10, 3, -2, 5, -7, 5, -5, 7, 5, -2, -2, 0, -1, 3, 1, 4, 0, -4, -4, 5, 5, 7, 4,
4, 4, -2, 5, -1, 5, 1, 4, 5, 4, -8, 7, 4, -1, -6, -2, -3, -4, -1, 0, 7, 7, 1, 7, -3, 5, -3, 5, -5, 1, -5, 0, -1, -9, 10, 1, 7, -2, 2, -8, -7, -9, 3, 1, 5, -4, 6, 4, -2, 0, 4, -10, 6, 4, 5, 3, -4, -2, -2, -3, 4, -3, -1, 2
, 10, 0, 0, 1, -3, 0, -8, 1, -2,

Signal A
maximum of array for signal is : 10
minimum of array for signal is : -9
indices of min is:67, 79, 132, 147,
indices of max is:164, 198,
Number of zero Count: 18

Signal B
maximum of array for signal is : 10
minimum of array for signal is : -10
indices of min is:97, 178,
indices of max is:104, 161, 191,
Number of zero Count: 18

 Zero count different between A and B: 0
```

Q2

i)

```c
void Generate_Database(struct computer q)
{
    int c;// counter for generate random number
    for (c = 0; c < 100; c++) {
        d.brand = rand() % 6;
        d.Database_b[c] = d.brand;
    }
    for (c = 0; c < 100; c++) {
        d.Cost = (5000 - 500 + 1) * (((float)rand()) / (float)(RAND_MAX))+500;
        d.Database_c[c] = d.Cost;
    }
    for (c = 0; c < 100; c++){
        d.Ram = (rand() % 6) + 2;
        d.Ram = pow(2, d.Ram);
        d.Database_r[c] = d.Ram;
        }

    for (c = 0; c < 100; c++) {
        d.GPU = rand() % 2 + 0;
        d.Database_G[c] = d.GPU;

    }
    return 0;
}
```

ii)

```
Brand number (Item 1 to 5):4,1,5,0,1,
Cost (Item 1 to 5):4550.72,4618.17,3835.61,3332.58,2411.55,
Ram size (Item 1 to 5):128,4,4,32,32,
GPU (Item 1 to 5):1,1,1,1,0,
```

iii)

```
Brand number (Item 1 to 5):4,1,5,0,1,
Cost (Item 1 to 5):4550.72,4618.17,3835.61,3332.58,2411.55,
Ram size (Item 1 to 5):128,4,4,32,32,
GPU (Item 1 to 5):1,1,1,1,0,

Cheapest item's price with GPU:987.64(With Brand: 0, ,CPU: 1, and Ram: 128,)
Cheapest item's index with GPU:20

C:\Users\tanxi\source\repos\Lab3\x64\Debug\Lab3.exe (process 10492) exited with code 0.
To automatically close the console when debugging stops, enable Tools->Options->Debugging->Automatically close the console when debugging stops.
Press any key to close this window . . .
```

Q3

i)

```
Display value of  x1 to x5:1, 2, 3, 4, 5
```

ii)

```
Display address location of  x1 to x5:dbf7f994, dbf7f9b4, dbf7f9d4, dbf7f9f4, dbf7fa14
```

iii)

```
Display value of  x1 to x5 using pointer variable:1, 2, 3, 4, 5
```

iv)

```
Display sum of  x1 to x5 using pointer variable:15
```

v)

```
Display product of  x1 to x5 using pointer variable:120
```

vi)

```
Max of  x1 to x5 using pointer variable:5
```

vii)

```
Generate 10 random value of Signal array:199, 64, 158, 77, 132, 67, 180, 24, 146, 13,
```

viii)

```
The Prefix_Sum values :199, 263, 421, 498, 630, 697, 877, 901, 1047, 1060,
```

Overall output:

```
Display value of  x1 to x5:1, 2, 3, 4, 5
Display address location of  x1 to x5:994ff7b4, 994ff7d4, 994ff7f4, 994ff814, 994ff834
Display value of  x1 to x5 using pointer variable:1, 2, 3, 4, 5
Display sum of  x1 to x5 using pointer variable:15
Display product of  x1 to x5 using pointer variable:120
Max of  x1 to x5 using pointer variable:5
Generate 10 random value of Signal array:142, 90, 70, 173, 21, 10, 77, 115, 57, 110,
The Prefix_Sum values :142, 232, 302, 475, 496, 506, 583, 698, 755, 865,
```