**CS2106 Introduction to Operating Systems**

**Lab 1 - Leveling Up on C**

**Answer Book**

Please read the instructions in the main lab sheet before completing this document. Submission deadline is **Sunday 8 September 2024, 11.59 pm (2359 hrs)**.

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Section 1

**Question 1.1 (1 mark)**

It looks for the stdio.h file in the directory “/usr/include”.

**Question 1.2 (1 mark)**

It means the variables have internal linkage and are local to the current source file (i.e. they are inaccessible to other source files). They are stored in the data segment in memory.

**Question 1.3 (1 mark)**

Missing function declarations/prototypes for enq(double) and deq() in “queue.h”.

**Question 1.4 (1 mark)**

void enq(double);

double deq();Section 2

**Question 2.1 (1 mark)**

|  |  |  |
| --- | --- | --- |
| **Variable** | **Global / Local** | **Address** |
| p1 | G | 0x561f88008018 |
| p2 | G | 0x561f88008020 |
| p3 | G | 0x561f88008028 |
| p4 | G | 0x561f88008030 |
| w | L | 0x561f88008038 |
| x | L | 0x7fff9262182c |
| y | L | 0x7fff92621828 |
| z | L | 0x7fff92621834 |

**Question 2.2 (1 mark)**

|  |  |
| --- | --- |
| **Variable** | **Location (S, D, T or H)** |
| p1 | D |
| p2 | D |
| p3 | D |
| p4 | D |
| w | D |
| x | S |
| y | S |
| z | S |

How I inferred these answers from Q2.1:

Variables in the same location share the same value for the front part of their addresses.

**Question 2.3 (1 mark)**

Static variables are created in the data segment of memory and hence their values are not stored in the stack frame of a function call on the call stack, which (the stack frame) will be cleared after the function exits.

**Question 2.4 (1 mark)**

A static local variable is only accessible within the function in which it was declared while a static global variable is accessible to any function within the source file it was declared in.

**Question 2.5 (1 mark)**

I added the ‘static’ keyword to the int variable acc. This causes the value in acc to be stored in the data segment of memory and hence be preserved across multiple function calls.

Section 3

**Question 3.1 (1 mark)**

<Your answer here>

**Question 3.2 (1 mark)**

<Your answer here>

**Question 3.3 (1 mark)**

<Your answer here>

Section 4

**Question 4.1 (1 mark)**

<Your answer here>

**Question 4.2 (1 mark)**

<Your answer here>

**TOTAL: \_\_\_\_\_\_\_\_\_\_\_ / 14**