Assignment 1 - Report

SYSC 4001-A

Group: SYSC4001 L2 - 6
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In the simulation, increasing the value of save/restore context time increases the total execution time of the program. The same result occurs when increasing the value of ISR activity time.
An example of this phenomenon is shown in the table below, where save/restore context time changes between 10, 20, and 30, and ISR activity time changes between 40, 100, and 200:

Table 1: Trace1 Total Execution Times

		Save/restore context time (ms)		
		10	20	30
ISR activity time (ms)	40	4032	4072	4112
	100	4335	4375	4415
	200	5438	5478	5518

In Table 1, the total execution times increases in each row as save/restore context time increases, and in each column as ISR activity time increases.

Effect of Changing Address Size (2 byte to 4 byte)

1. Vector Table Size Increase
   Each ISR address doubles in size. Although the simulation assumes fixed access times (1 ms), a real system would require more time to fetch larger addresses.

2. Higher Context Switch Overhead
   Since the Program Counter (and possibly other pointers) become 4 bytes, more data must be saved/restored during interrupts. If the simulation scaled this time with data size, total overhead would rise, lengthening execution.

3. Architectural Implications
   A 4-byte address allows 32-bit memory addressing, enabling access to a much larger memory space and supporting larger programs. When returning from interrupts, the system restores a 4-byte PC value, reflecting a broader addressable range.

If any issues occur while running the program, please see the important note section in the github repo.