Assignment #1 Report

SYSC 4001-L4

Group #21

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2025-10-06

Understanding How Interrupt Timing Affects Performance

After running twenty different simulation tests, we observed clear patterns in how the timing of each step in the interrupt process affects total execution time and overall CPU efficiency. In these simulations, we varied the context save/restore time—the time required to switch in and out of an interrupt—between 10, 20, and 30 milliseconds. We also varied the ISR (Interrupt Service Routine) activity time, which represents how long the interrupt routine runs, from 40 up to 200 milliseconds. The goal was to analyze how these parameters influence the balance between useful work (CPU processing and I/O) and the overhead introduced by the operating system during interrupts.

When the context save and restore times increased from 10 ms to 20 ms and then to 30 ms, we observed that the total runtime grew almost linearly. This is expected, as every interrupt must undergo these steps, meaning even a small increase compounds across multiple interrupts. At 10 ms, the system performed efficiently, spending more time on productive CPU work. By 30 ms, much of the time was consumed by switching overhead, confirming that context switching introduces a predictable, linear cost, doubling the context time roughly doubles the time wasted on this process.

The biggest impact came from changing the ISR activity time. When kept low (around 40 or 80 ms), the program finished quickly, and interrupts didn't get in the way too much. But once we started raising it to 120, 160, and 200 ms, the system struggled. The total runtime went up, and it became obvious that the CPU was spending most of its time inside the ISR instead of doing normal user tasks. At 160 or 200 ms, the interrupts took over more than half of the CPU's total time was being spent handling interrupts. This is what happens in real systems too: if the interrupt routines take too long, the whole system feels slow and unresponsive because the CPU never gets enough time to do regular work.

When both the context time and ISR time were high (for example, context = 30 ms and ISR = 200 ms), the total runtime was more than double compared to the best-case scenario (context = 10 ms and ISR = 40 ms). This combination created a "worst case" where the CPU was constantly busy saving context, jumping into interrupts, and spending hundreds of milliseconds inside the ISR before returning to user mode. It clearly showed how sensitive the total performance is to these parameters the faster these steps are, the smoother and more efficient the entire system becomes.

We also tested what happens if we use 4-byte vector addresses instead of 2-byte ones. The only real difference was that the reported memory positions in the output doubled (for example, 0x000E became 0x001C). The total runtime barely changed because the vector lookup and address loading steps each still take only 1 ms. So, in this simulation, vector size didn't make any noticeable difference. In a real processor, a larger address might slightly increase memory latency, but compared to ISR times in the hundreds of milliseconds, that effect is basically negligible.

The results also illustrated what would happen with a faster CPU. If user-level code executes more quickly but interrupt handling remains fixed, the proportion of time spent servicing interrupts increases.

By separating interrupt overhead from productive CPU work, we could see how the balance shifted. In optimal cases, interrupt overhead accounted for roughly one-third of total runtime, which is acceptable. Under higher context and ISR durations, overhead consumed nearly two-thirds of runtime, meaning most of the CPU's effort was spent on operating system work rather than actual processing

or I/O—a substantial loss in efficiency. These findings emphasize that optimizing interrupt performance is essential for maintaining responsiveness and throughput.

In conclusion, the simulations clearly demonstrated that interrupt efficiency directly affects system performance. Increasing context save/restore times linearly increases total runtime, while increasing ISR times has an even greater impact—sometimes doubling or tripling execution time. Vector size has negligible influence, and faster CPUs only make interrupt overhead more apparent. The key takeaway is that interrupt routines should remain as short as possible, and context switching must be optimized for speed. When both are efficient, the system runs smoothly and dedicates more time to real computational work rather than being dominated by overhead.

Repository link: https://github.com/ibrahimalwaki/SYSC4001_A1

Output files

1)
0, 50, CPU
50, 1, switch to kernel mode
51, 10, context saved
61, 1, find vector 7 in memory position 0x000E
62, 1, load address 0X00BD into the PC
63, 76, run device driver (part 1)
139, 76, run device driver (part 2)
215, 1, IRET
216, 1, switch to user mode
217, 1, switch to kernal mode
218, 10, context save
228, 1, find vector 7
229, 1, load address 0X00BD into PC
230, 40, ENDIO: run the ISR
270, 1, IRET
271, 1, switch to user mode
272, 100, CPU
372, 1, switch to kernel mode
373, 10, context saved
383, 1, find vector 12 in memory position 0x0018
384, 1, load address 0X03B9 into the PC
385, 72, run device driver (part 1)
457, 73, run device driver (part 2)
530, 1, IRET
531, 1, switch to user mode
532, 1, switch to kernal mode
533, 10, context save
543, 1, find vector 12
544, 1, load address 0X03B9 into PC
545, 40, ENDIO: run the ISR
585, 1, IRET
586, 1, switch to user mode
587, 20, CPU

2)
0, 80, CPU
80, 1, switch to kernel mode
81, 10, context saved
91, 1, find vector 7 in memory position 0x000E
92, 1, load address 0X00BD into the PC
93, 76, run device driver (part 1)

169, 76, run device driver (part 2)
245, 1, IRET
246, 1, switch to user mode
247, 40, CPU
287, 1, switch to kernel mode
288, 10, context saved
298, 1, find vector 12 in memory position 0x0018
299, 1, load address 0X03B9 into the PC
300, 72, run device driver (part 1)
372, 73, run device driver (part 2)
445, 1, IRET
446, 1, switch to user mode
447, 30, CPU
477, 1, switch to kernal mode
478, 10, context save
488, 1, find vector 12
489, 1, load address 0X03B9 into PC
490, 40, ENDIO: run the ISR
530, 1, IRET
531, 1, switch to user mode
532, 60, CPU
592, 1, switch to kernal mode
593, 10, context save
603, 1, find vector 7
604, 1, load address 0X00BD into PC
605, 40, ENDIO: run the ISR
645, 1, IRET
646, 1, switch to user mode
647, 90, CPU

3)
0, 30, CPU
30, 1, switch to kernel mode
31, 10, context saved
41, 1, find vector 3 in memory position 0x0006
42, 1, load address 0X0695 into the PC
43, 150, run device driver (part 1)
193, 150, run device driver (part 2)
343, 1, IRET
344, 1, switch to user mode
345, 1, switch to kernal mode
346, 10, context save
356, 1, find vector 3
357, 1, load address 0X0695 into PC
358, 40, ENDIO: run the ISR

398, 1, IRET
399, 1, switch to user mode
400, 20, CPU
420, 1, switch to kernel mode
421, 10, context saved
431, 1, find vector 5 in memory position 0x000A
432, 1, load address 0X048B into the PC
433, 211, run device driver (part 1)
644, 0, run device driver (part 2)
644, 1, IRET
645, 1, switch to user mode
646, 40, CPU
686, 1, switch to kernel mode
687, 10, context saved
697, 1, find vector 9 in memory position 0x0012
698, 1, load address 0X036C into the PC
699, 500, run device driver (part 1)
1199, 500, run device driver (part 2)
1699, 1, IRET
1700, 1, switch to user mode
1701, 1, switch to kernal mode
1702, 10, context save
1712, 1, find vector 9
1713, 1, load address 0X036C into PC
1714, 40, ENDIO: run the ISR
1754, 1, IRET
1755, 1, switch to user mode
1756, 50, CPU

4)
0, 200, CPU
200, 1, switch to kernel mode
201, 10, context saved
211, 1, find vector 7 in memory position 0x000E
212, 1, load address 0X00BD into the PC
213, 76, run device driver (part 1)
289, 76, run device driver (part 2)
365, 1, IRET
366, 1, switch to user mode
367, 150, CPU
517, 1, switch to kernal mode
518, 10, context save
528, 1, find vector 7
529, 1, load address 0X00BD into PC
530, 40, ENDIO: run the ISR
570, 1, IRET

571, 1, switch to user mode
572, 80, CPU

5)
0, 40, CPU
40, 1, switch to kernel mode
41, 10, context saved
51, 1, find vector 3 in memory position 0x0006
52, 1, load address 0X0695 into the PC
53, 150, run device driver (part 1)
203, 150, run device driver (part 2)
353, 1, IRET
354, 1, switch to user mode
355, 1, switch to kernel mode
356, 10, context saved
366, 1, find vector 12 in memory position 0x0018
367, 1, load address 0X03B9 into the PC
368, 72, run device driver (part 1)
440, 73, run device driver (part 2)
513, 1, IRET
514, 1, switch to user mode
515, 1, switch to kernal mode
516, 10, context save
526, 1, find vector 12
527, 1, load address 0X03B9 into PC
528, 40, ENDIO: run the ISR
568, 1, IRET
569, 1, switch to user mode
570, 1, switch to kernal mode
571, 10, context save
581, 1, find vector 3
582, 1, load address 0X0695 into PC
583, 40, ENDIO: run the ISR
623, 1, IRET
624, 1, switch to user mode
625, 100, CPU

6)
0, 20, CPU
20, 1, switch to kernel mode
21, 10, context saved
31, 1, find vector 4 in memory position 0x0008
32, 1, load address 0X0292 into the PC
33, 250, run device driver (part 1)
283, 250, run device driver (part 2)
533, 1, IRET

534, 1, switch to user mode
535, 1, switch to kernal mode
536, 10, context save
546, 1, find vector 4
547, 1, load address 0X0292 into PC
548, 40, ENDIO: run the ISR
588, 1, IRET
589, 1, switch to user mode
590, 15, CPU
605, 1, switch to kernel mode
606, 10, context saved
616, 1, find vector 6 in memory position 0x000C
617, 1, load address 0X0639 into the PC
618, 132, run device driver (part 1)
750, 133, run device driver (part 2)
883, 1, IRET
884, 1, switch to user mode
885, 1, switch to kernal mode
886, 10, context save
896, 1, find vector 6
897, 1, load address 0X0639 into PC
898, 40, ENDIO: run the ISR
938, 1, IRET
939, 1, switch to user mode
940, 25, CPU

7)
0, 100, CPU
100, 1, switch to kernel mode
101, 10, context saved
111, 1, find vector 8 in memory position 0x0010
112, 1, load address 0X06EF into the PC
113, 500, run device driver (part 1)
613, 500, run device driver (part 2)
1113, 1, IRET
1114, 1, switch to user mode
1115, 20, CPU
1135, 1, switch to kernal mode
1136, 10, context save
1146, 1, find vector 8
1147, 1, load address 0X06EF into PC
1148, 40, ENDIO: run the ISR
1188, 1, IRET
1189, 1, switch to user mode
1190, 150, CPU
1340, 1, switch to kernel mode

1341, 10, context saved
1351, 1, find vector 11 in memory position 0x0016
1352, 1, load address 0X07B0 into the PC
1353, 282, run device driver (part 1)
1635, 282, run device driver (part 2)
1917, 1, IRET
1918, 1, switch to user mode
1919, 1, switch to kernal mode
1920, 10, context save
1930, 1, find vector 11
1931, 1, load address 0X07B0 into PC
1932, 40, ENDIO: run the ISR
1972, 1, IRET
1973, 1, switch to user mode
1974, 10, CPU

8)
0, 50, CPU
50, 1, switch to kernel mode
51, 10, context saved
61, 1, find vector 7 in memory position 0x000E
62, 1, load address 0X00BD into the PC
63, 76, run device driver (part 1)
139, 76, run device driver (part 2)
215, 1, IRET
216, 1, switch to user mode
217, 1, switch to kernel mode
218, 10, context saved
228, 1, find vector 9 in memory position 0x0012
229, 1, load address 0X036C into the PC
230, 78, run device driver (part 1)
308, 78, run device driver (part 2)
386, 1, IRET
387, 1, switch to user mode
388, 1, switch to kernal mode
389, 10, context save
399, 1, find vector 7
400, 1, load address 0X00BD into PC
401, 40, ENDIO: run the ISR
441, 1, IRET
442, 1, switch to user mode
443, 1, switch to kernal mode
444, 10, context save
454, 1, find vector 9
455, 1, load address 0X036C into PC
456, 40, ENDIO: run the ISR

496, 1, IRET
497, 1, switch to user mode
498, 60, CPU

9)
0, 70, CPU
70, 1, switch to kernel mode
71, 10, context saved
81, 1, find vector 1 in memory position 0x0002
82, 1, load address 0X029C into the PC
83, 50, run device driver (part 1)
133, 50, run device driver (part 2)
183, 1, IRET
184, 1, switch to user mode
185, 1, switch to kernel mode
186, 10, context saved
196, 1, find vector 2 in memory position 0x0004
197, 1, load address 0X0695 into the PC
198, 75, run device driver (part 1)
273, 75, run device driver (part 2)
348, 1, IRET
349, 1, switch to user mode
350, 1, switch to kernel mode
351, 10, context saved
361, 1, find vector 3 in memory position 0x0006
362, 1, load address 0X0695 into the PC
363, 150, run device driver (part 1)
513, 150, run device driver (part 2)
663, 1, IRET
664, 1, switch to user mode
665, 1, switch to kernal mode
666, 10, context save
676, 1, find vector 1
677, 1, load address 0X029C into PC
678, 40, ENDIO: run the ISR
718, 1, IRET
719, 1, switch to user mode
720, 1, switch to kernal mode
721, 10, context save
731, 1, find vector 2
732, 1, load address 0X0695 into PC
733, 40, ENDIO: run the ISR
773, 1, IRET
774, 1, switch to user mode
775, 1, switch to kernal mode
776, 10, context save

786, 1, find vector 3
787, 1, load address 0X0695 into PC
788, 40, ENDIO: run the ISR
828, 1, IRET
829, 1, switch to user mode
830, 50, CPU

10)
0, 90, CPU burst
90, 1, switch to kernel mode
91, 10, context saved
101, 1, find vector 4 in memory position 0x0008
102, 1, load address 0X0292 into the PC
103, 40, call device driver (activity 1)
143, 40, call device driver (activity 2)
183, 40, call device driver (activity 3)
223, 1, IRET
224, 1, switch to kernel mode
225, 10, context saved
235, 1, find vector 5 in memory position 0x000A
236, 1, load address 0X048B into the PC
237, 40, call device driver (activity 1)
277, 40, call device driver (activity 2)
317, 40, call device driver (activity 3)
357, 1, IRET
358, 120, CPU burst
478, 211, end of I/O 5: interrupt
689, 1, switch to kernel mode
690, 10, context saved
700, 1, find vector 5 in memory position 0x000A
701, 1, load address 0X048B into the PC
702, 40, call device driver (activity 1)
742, 1, IRET
743, 250, end of I/O 4: interrupt
993, 1, switch to kernel mode
994, 10, context saved
1004, 1, find vector 4 in memory position 0x0008
1005, 1, load address 0X0292 into the PC
1006, 40, call device driver (activity 1)
1046, 1, IRET
1047, 40, CPU burst

11)
0, 90, CPU burst
90, 1, switch to kernel mode
91, 10, context saved
101, 1, find vector 4 in memory position 0x0008
102, 1, load address 0X0292 into the PC

103, 40, call device driver (activity 1)
143, 40, call device driver (activity 2)
183, 40, call device driver (activity 3)
223, 1, IRET
224, 1, switch to kernel mode
225, 10, context saved
235, 1, find vector 5 in memory position 0x000A
236, 1, load address 0X048B into the PC
237, 40, call device driver (activity 1)
277, 40, call device driver (activity 2)
317, 40, call device driver (activity 3)
357, 1, IRET
358, 120, CPU burst
478, 211, end of I/O 5: interrupt
689, 1, switch to kernel mode
690, 10, context saved
700, 1, find vector 5 in memory position 0x000A
701, 1, load address 0X048B into the PC
702, 40, call device driver (activity 1)
742, 1, IRET
743, 250, end of I/O 4: interrupt
993, 1, switch to kernel mode
994, 10, context saved
1004, 1, find vector 4 in memory position 0x0008
1005, 1, load address 0X0292 into the PC
1006, 40, call device driver (activity 1)
1046, 1, IRET
1047, 40, CPU burst

12)
0, 20, CPU burst
20, 1, switch to kernel mode
21, 10, context saved
31, 1, find vector 6 in memory position 0x000C
32, 1, load address 0X0639 into the PC
33, 40, call device driver (activity 1)
73, 40, call device driver (activity 2)
113, 40, call device driver (activity 3)
153, 1, IRET
154, 10, CPU burst
164, 956, end of I/O 6: interrupt
1120, 1, switch to kernel mode
1121, 10, context saved
1131, 1, find vector 6 in memory position 0x000C
1132, 1, load address 0X0639 into the PC
1133, 40, call device driver (activity 1)
1173, 1, IRET
1174, 30, CPU burst

1204, 1, switch to kernel mode
1205, 10, context saved
1215, 1, find vector 7 in memory position 0x000E
1216, 1, load address 0X00BD into the PC
1217, 40, call device driver (activity 1)
1257, 40, call device driver (activity 2)
1297, 40, call device driver (activity 3)
1337, 1, IRET
1338, 235, end of I/O 7: interrupt
1573, 1, switch to kernel mode
1574, 10, context saved
1584, 1, find vector 7 in memory position 0x000E
1585, 1, load address 0X00BD into the PC
1586, 40, call device driver (activity 1)
1626, 1, IRET
1627, 15, CPU burst

13)
0, 60, CPU burst
60, 1, switch to kernel mode
61, 10, context saved
71, 1, find vector 15 in memory position 0x001E
72, 1, load address 0X0584 into the PC
73, 40, call device driver (activity 1)
113, 40, call device driver (activity 2)
153, 40, call device driver (activity 3)
193, 1, IRET
194, 70, CPU burst
264, 68, end of I/O 15: interrupt
332, 1, switch to kernel mode
333, 10, context saved
343, 1, find vector 15 in memory position 0x001E
344, 1, load address 0X0584 into the PC
345, 40, call device driver (activity 1)
385, 1, IRET
386, 40, CPU burst

14)
0, 1, switch to kernel mode
1, 10, context saved
11, 1, find vector 3 in memory position 0x0006
12, 1, load address 0X0695 into the PC
13, 40, call device driver (activity 1)
53, 1, IRET
54, 3, end of I/O 3: interrupt
57, 1, switch to kernel mode
58, 10, context saved
68, 1, find vector 3 in memory position 0x0006

69, 1, load address 0X0695 into the PC
70, 40, call device driver (activity 1)
110, 1, IRET
111, 1, switch to kernel mode
112, 10, context saved
122, 1, find vector 4 in memory position 0x0008
123, 1, load address 0X0292 into the PC
124, 40, call device driver (activity 1)
164, 1, IRET
165, 4, end of I/O 4: interrupt
169, 1, switch to kernel mode
170, 10, context saved
180, 1, find vector 4 in memory position 0x0008
181, 1, load address 0X0292 into the PC
182, 40, call device driver (activity 1)
222, 1, IRET
223, 1, switch to kernel mode
224, 10, context saved
234, 1, find vector 5 in memory position 0x000A
235, 1, load address 0X048B into the PC
236, 40, call device driver (activity 1)
276, 1, IRET
277, 211, end of I/O 5: interrupt
488, 1, switch to kernel mode
489, 10, context saved
499, 1, find vector 5 in memory position 0x000A
500, 1, load address 0X048B into the PC
501, 40, call device driver (activity 1)
541, 1, IRET
542, 50, CPU burst

15)
0, 30, CPU burst
30, 1, switch to kernel mode
31, 10, context saved
41, 1, find vector 2 in memory position 0x0004
42, 1, load address 0X029C into the PC
43, 40, call device driver (activity 1)
83, 40, call device driver (activity 2)
123, 40, call device driver (activity 3)
163, 1, IRET
164, 2, end of I/O 2: interrupt
166, 1, switch to kernel mode
167, 10, context saved
177, 1, find vector 2 in memory position 0x0004
178, 1, load address 0X029C into the PC
179, 40, call device driver (activity 1)
219, 1, IRET

220, 60, CPU burst
280, 1, switch to kernel mode
281, 10, context saved
291, 1, find vector 14 in memory position 0x001C
292, 1, load address 0X06C7 into the PC
293, 40, call device driver (activity 1)
333, 40, call device driver (activity 2)
373, 40, call device driver (activity 3)
413, 1, IRET
414, 636, end of I/O 14: interrupt
1050, 1, switch to kernel mode
1051, 10, context saved
1061, 1, find vector 14 in memory position 0x001C
1062, 1, load address 0X06C7 into the PC
1063, 40, call device driver (activity 1)
1103, 1, IRET
1104, 90, CPU burst

16)
0, 40, CPU burst
40, 1, switch to kernel mode
41, 10, context saved
51, 1, find vector 5 in memory position 0x000A
52, 1, load address 0X048B into the PC
53, 40, call device driver (activity 1)
93, 40, call device driver (activity 2)
133, 40, call device driver (activity 3)
173, 1, IRET
174, 1, switch to kernel mode
175, 10, context saved
185, 1, find vector 6 in memory position 0x000C
186, 1, load address 0X0639 into the PC
187, 40, call device driver (activity 1)
227, 40, call device driver (activity 2)
267, 40, call device driver (activity 3)
307, 1, IRET
308, 265, end of I/O 6: interrupt
573, 1, switch to kernel mode
574, 10, context saved
584, 1, find vector 6 in memory position 0x000C
585, 1, load address 0X0639 into the PC
586, 40, call device driver (activity 1)
626, 1, IRET
627, 152, end of I/O 5: interrupt
779, 1, switch to kernel mode
780, 10, context saved
790, 1, find vector 5 in memory position 0x000A
791, 1, load address 0X048B into the PC

792, 40, call device driver (activity 1)
832, 1, IRET
833, 100, CPU burst

17)
0, 40, CPU burst
40, 1, switch to kernel mode
41, 10, context saved
51, 1, find vector 5 in memory position 0x000A
52, 1, load address 0X048B into the PC
53, 40, call device driver (activity 1)
93, 40, call device driver (activity 2)
133, 40, call device driver (activity 3)
173, 1, IRET
174, 1, switch to kernel mode
175, 10, context saved
185, 1, find vector 6 in memory position 0x000C
186, 1, load address 0X0639 into the PC
187, 40, call device driver (activity 1)
227, 40, call device driver (activity 2)
267, 40, call device driver (activity 3)
307, 1, IRET
308, 265, end of I/O 6: interrupt
573, 1, switch to kernel mode
574, 10, context saved
584, 1, find vector 6 in memory position 0x000C
585, 1, load address 0X0639 into the PC
586, 40, call device driver (activity 1)
626, 1, IRET
627, 152, end of I/O 5: interrupt
779, 1, switch to kernel mode
780, 10, context saved
790, 1, find vector 5 in memory position 0x000A
791, 1, load address 0X048B into the PC
792, 40, call device driver (activity 1)
832, 1, IRET
833, 100, CPU burst

18)
0, 100, CPU burst
100, 1, switch to kernel mode
101, 10, context saved
111, 1, find vector 18 in memory position 0x0024
112, 1, load address 0X060A into the PC
113, 40, call device driver (activity 1)
153, 40, call device driver (activity 2)
193, 40, call device driver (activity 3)
233, 1, IRET

234, 30, CPU burst
264, 652, end of I/O 18: interrupt
916, 1, switch to kernel mode
917, 10, context saved
927, 1, find vector 18 in memory position 0x0024
928, 1, load address 0X060A into the PC
929, 40, call device driver (activity 1)
969, 1, IRET
970, 50, CPU burst
1020, 1, switch to kernel mode
1021, 10, context saved
1031, 1, find vector 19 in memory position 0x0026
1032, 1, load address 0X0765 into the PC
1033, 40, call device driver (activity 1)
1073, 40, call device driver (activity 2)
1113, 40, call device driver (activity 3)
1153, 1, IRET
1154, 652, end of I/O 19: interrupt
1806, 1, switch to kernel mode
1807, 10, context saved
1817, 1, find vector 19 in memory position 0x0026
1818, 1, load address 0X0765 into the PC
1819, 40, call device driver (activity 1)
1859, 1, IRET
1860, 80, CPU burst

19)
0, 90, CPU burst
90, 1, switch to kernel mode
91, 10, context saved
101, 1, find vector 1 in memory position 0x0002
102, 1, load address 0X029C into the PC
103, 40, call device driver (activity 1)
143, 40, call device driver (activity 2)
183, 40, call device driver (activity 3)
223, 1, IRET
224, 1, switch to kernel mode
225, 10, context saved
235, 1, find vector 2 in memory position 0x0004
236, 1, load address 0X0695 into the PC
237, 40, call device driver (activity 1)
277, 40, call device driver (activity 2)
317, 40, call device driver (activity 3)
357, 1, IRET
358, 1, switch to kernel mode
359, 10, context saved
369, 1, find vector 3 in memory position 0x0006
370, 1, load address 0X0695 into the PC

371, 40, call device driver (activity 1)
411, 40, call device driver (activity 2)
451, 40, call device driver (activity 3)
491, 1, IRET
492, 564, end of I/O 3: interrupt
1056, 1, switch to kernel mode
1057, 10, context saved
1067, 1, find vector 3 in memory position 0x0006
1068, 1, load address 0X0695 into the PC
1069, 40, call device driver (activity 1)
1109, 1, IRET
1110, 523, end of I/O 2: interrupt
1633, 1, switch to kernel mode
1634, 10, context saved
1644, 1, find vector 2 in memory position 0x0004
1645, 1, load address 0X029C into the PC
1646, 40, call device driver (activity 1)
1686, 1, IRET
1687, 110, end of I/O 1: interrupt
1797, 1, switch to kernel mode
1798, 10, context saved
1808, 1, find vector 1 in memory position 0x0002
1809, 1, load address 0X029C into the PC
1810, 40, call device driver (activity 1)
1850, 1, IRET
1851, 120, CPU burst

20)
0, 50, CPU burst
50, 1, switch to kernel mode
51, 10, context saved
61, 1, find vector 5 in memory position 0x000A
62, 1, load address 0X048B into the PC
63, 40, call device driver (activity 1)
103, 40, call device driver (activity 2)
143, 40, call device driver (activity 3)
183, 1, IRET
184, 40, CPU burst
224, 1, switch to kernel mode
225, 10, context saved
235, 1, find vector 10 in memory position 0x0014
236, 1, load address 0X07B0 into the PC
237, 40, call device driver (activity 1)
277, 40, call device driver (activity 2)
317, 40, call device driver (activity 3)
357, 1, IRET
358, 145, end of I/O 10: interrupt
503, 1, switch to kernel mode

504, 10, context saved
514, 1, find vector 10 in memory position 0x0014
515, 1, load address 0X07B0 into the PC
516, 40, call device driver (activity 1)
556, 1, IRET
557, 60, CPU burst
617, 1, switch to kernel mode
618, 10, context saved
628, 1, find vector 7 in memory position 0x000E
629, 1, load address 0X00BD into the PC
630, 40, call device driver (activity 1)
670, 40, call device driver (activity 2)
710, 40, call device driver (activity 3)
750, 1, IRET
751, 211, end of I/O 5: interrupt
962, 1, switch to kernel mode
963, 10, context saved
973, 1, find vector 5 in memory position 0x000A
974, 1, load address 0X048B into the PC
975, 40, call device driver (activity 1)
1015, 1, IRET
1016, 152, end of I/O 7: interrupt
1168, 1, switch to kernel mode
1169, 10, context saved
1179, 1, find vector 7 in memory position 0x000E
1180, 1, load address 0X00BD into the PC
1181, 40, call device driver (activity 1)
1221, 1, IRET
1222, 90, CPU burst