Exercise sheet 11 – Scheduling

Goals:

- Scheduling strategy calculations
- Scheduling strategy knowledge
- Scheduling on Linux (optional)

Exercise 11.1: Scheduling strategy calculations

There are five background jobs/processes (A - E), which are at the same time given to a computer for processing. Arrival order, processing time, and priority for each job is stated in the table (5 is the highest priority).

Arrival order	Job	Processing time (in min)	Priority
1	A	10	3
2	B	6	5
3	C	2	2
4	D	4	1
5	E	8	4

Calculate the mean residence time for each job for each of the following algorithms! You don't need to consider the time needed for changing the process and I/O (context switch). In exercises b) to e) it is expected, that the job is completed, before it is changed to the next one (non-preemptive). Consider a single core CPU for this exercise.

(a) Round Robin with processor sharing. Use 2 min. as time slice.

(b) Priority based scheduling

(c) First come first served (FCFS)

(d) Shortest job first (SJF)

(e) Shortest job first (SJF) with new arrival time: (A: 0, B: 2, C: 3, D: 11, E:14)

Exercise 11.2: Scheduling strategy knowledge

Hint: Please give a suitable reason for your answers.

(a) Is the FCFS scheduling strategy well suited for desktop systems?

(b) For what is SJF optimised?

(c) Why is RR better suited for desktop systems than FCFS?

(d) Why is EDF better suited for real-time systems than FCFS?

(e) Which scheduling strategy is usually used in shops when you want to pay your goods? Is this the best strategy to serve as much customers as possible?

Exercise 11.3: Scheduling on Linux (optional)

(a) Read about the Linux CFQ (completely fair queuing) scheduler. Here are some literature points:

- `https://www.thomas-krenn.com/de/wiki/Linux_I/O_Scheduler#CFQ`

- https://en.wikipedia.org/wiki/Completely_Fair_Scheduler
- https://www.phoronix.com/scan.php?page=article&item=linux_2637_video&num=1
- http://www.ece.ubc.ca/~sasha/papers/eurosys16-final29.pdf
- https://documentation.suse.com/sles/12-SP4/html/SLES-all/cha-tuning-taskscheduler.html

(b) How does it work? Which criteria are taken into account for scheduling?

(c) How does it work on single core CPUs?

(d) How does it work on multi core core CPUs?

(e) Is the CFQ scheduler suitable for real-time systems?