

# Homework 04

ECE 473/573, Fall 2024

*Due Date: 10/27 (Sun.) by the end of the day (Chicago time)*

In this homework we will study task scheduling for resource management. Suppose at time 0, a set of tasks arrive in the following order with their expected execution times:

1. Task A: 6 seconds
2. Task B: 8 seconds
3. Task C: 4 seconds
4. Task D: 10 seconds
5. Task E: 5 seconds

It is obvious we can schedule them one by one and complete all of them in 33 seconds. However, scheduling them to complete in different orders will result in very different completion times for individual tasks. Here we will consider the following scheduling policies that determine the order to schedule each task.

- First-Come-First-Served (FCFS): tasks are scheduled in the order of arrival, i.e. A, B, C, D, E.
  - Shortest Job First (SJF): tasks with shorter expected execution times are scheduled first, i.e. C, E, A, B, D.
  - Longest Job First (LJF): tasks with longer expected execution times are scheduled first, i.e. D, B, A, E, C.
  - Round Robin (RR): time slices are assigned to tasks following their order of arrival in rounds. A task at the end of the time slice, if not completed, is scheduled for the next round. Assume a fixed time slice of 3 seconds.
1. (*1 point*) For each scheduling policy (RR, FCFS, SJF, and LJF), determine the completion time for each task.
  2. (*1 point*) The turnaround time is defined as the time from task arrival to its completion. Calculate the average turnaround time for each scheduling policy. Is turnaround time a good measure for scheduling policies and which scheduling policy performs the best?