CMPE 322
Operating Systems

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Lecture Hours: W5, ThTh12 (PS: ThTh 67)
Classroom: Online
Website: https://moodle.boun.edu.tr

Objective:

Learn how the components of a computer system interact and focus specifically on operating systems. Study basic concepts like process management, memory management, storage management.

Textbook:

Operating System Concepts (9th Edition)
Authors: Silberschatz, Galvin, and Gagne
Publisher: John Wiley & Sons, Inc.
ISBN-13: 978-1118063330
ISBN-10: 1118063333

Grading:

Exam	*Weight*	*Date*
Participation	30%	All semester (See "flipped classroom" below)
Midterm	20%	Dec 17, 2020
Final exam	20%	TBA by the Registrar's Office
2 Projects	30%	TBA for each project

This semester we will switch to "flipped classroom" style of teaching. This implies a very significant change in how the course is taught and graded. Please read carefully and make sure you understand it.

Flipped classroom is a modern style of teaching in which the students get prepared for the lecture ahead of the lecture. The lectures provide a forum for discussions rather than a one-way flow of knowledge from the professor to the students. We will proceed as follows:

- For each week, I will record a video where I go over the slides in detail and explain all content. The video will be made available before the lecture (latest by Tuesday 9:00am) and you will be expected to have fully watched the video before the 1-hour lecture.
- During the 1-hour lecture, I will only mention some key concepts from the topic. I will not go over the video during the lecture (anyways, we will not have so much time). Therefore, it is not likely that you will benefit at all from that lecture unless you have watched the video before the lecture.

- During the 2-hour lecture, I will just display questions on the screen and give some limited time (several minutes) for you to discuss the answer in your team. *(More information is provided below about the formation of the teams.)*
    - When the time expires, I will pick a random group and a random member of that group to respond to that question. The score of that answer will be the grade of all members of that group. So, everyone should participate in the discussion and everyone should be ready to represent the group. These grades will constitute your "participation score" in the evaluation of the letter grade. (Of course, if a member of the group has not attended that lecture, (s)he will receive a score of zero even if the other group members receive a good score.)
    - After the response of a group to a question, I may ask the opinion of another group or proceed with the next question, depending on the question and the response.
    - Not all groups will have the chance to respond in a specific week, but I will try to make sure all groups have (almost) equal chance throughout the semester.
    - All students who have attended the 2-hour lecture will receive 1 extra point for their attendance. These 1 extra points will accumulate to approximately 10 points in your final score in the course, so it is highly recommended that you attend. Similarly, those students who have not attended the 2-hour lecture will receive 0 points even if their group was not asked to answer a question during the lecture. In other words, not attending the lecture is worse than your group being selected in that lecture and failing to answer the question (in the latter case, you would at least receive 1 point for attendance).
        - Attending the Zoom sessions will be blocked 5 minutes after the lecture has started and anyone who leaves before the end will be considered not to have attended at all (and get 0 points). Therefore, make sure that you are there during the lecture hours. In case you lose your connection, send an e-mail to the assistant and re-connect immediately. (Zoom gives a report of who entered and left the meeting at what time.)
- **Formation of the teams:** I will form and announce the teams, so you are not allowed to create your own teams. My primary concern in forming the teams will be to create balanced teams.
    - In all teams, there will be students who put more or less effort. Some will try to dominate rather than collaborate while some others will be free-riders. If the student I pick to answer the question performs poorly, the whole team will get a low score. This is a typical twist of team work in real life. You are supposed to solve these problems within the team.
    - The size of the teams will be determined according to the number of the students registered, but I expect to have 7-8 students per team. The teams are fixed throughout the semester.
    - You may use any means of communication within the team.

Additional Notes:

- CMPE250 or an equivalent course is a pre-requisite.
- No late projects are accepted; deadlines are strict. Therefore, do proper scheduling of your jobs.
- This course requires a lot of reading and you accept this burden if you take the course.

Tentative Outline:

- Introduction, evolution of operating systems, terminology, multiprogramming, time-sharing, computer and operating system structures, user and program interfaces
- **Process Management:** Concurrent processes, threads, process scheduling, process synchronization, critical section problem, semaphores, classical problems, monitors, atomic transactions, deadlock prevention, deadlock avoidance, deadlock detection and recovery
- **Memory Management:** Swapping, multiple partitions, paging, segmentation, virtual memory, page replacement algorithms
- **Storage Management:** File system interface. File system structures, allocation methods, free space management, file and directory implementation, disk structures and disk scheduling, I/O systems
- **Protection and Security:** Access matrix and rights, capabilities, security issues (If time permits)