School of Computer Science College of Science
Fundamentals of Operating Systems
homework 2

---

1. Write a program that simulates a web server using a thread pool. The program should accept requests from clients through a socket, and process them using a fixed number of worker threads, then return an appointment number to client. The program should also handle the following scenarios:

   - If the request is valid, the worker thread should send back a response with the content of the requested file, or a 404 error if the file does not exist.
   - If the request is invalid, the worker thread should send back a response with a 400 error.
   - If the thread pool is full, the program should reject new requests with a 503 error.
   - If the program receives a SIGINT signal, it should gracefully terminate all the threads and close the socket.

   The program should use the following functions and data structures:

   - "pthread create" and "pthread join" to create and join threads.
   - Functions to synchronize access to a shared queue of requests.
   - socket, listen, accept, send, and receive to communicate with clients.
   - signal to register a handler for SIGINT.

2. Write a program that calculates the sum of the elements of a matrix using OpenMP. The program should take two arguments: the name of a text file that contains the matrix and the number of threads to use.
   The program should use the following steps:

   - Read the matrix from the text file and store it in a 2D array.
   - Use OpenMP directives and functions to parallelize the loop that sums the elements of the array.
   - Use OpenMP reduction clause to aggregate the sum from each thread.