Assignment 1

1. Write a C program using unnamed pipes to implement communication between a parent and child process.
    - Parent sends an array of integers to the child.
    - Child computes the sum and sends the result back to the parent.

    Functions to use: pipe(), fork(), write(), read().

2. Write a program where two processes communicate using shared memory.

    - Process 1 writes a string into shared memory.
    - Process 2 reads it and converts it into uppercase.

    Functions to use: shmget(), shmat(), shmdt(), shmctl().

3. Write a C program (using pthreads) that uses n threads (n is taken as input from user) to compute the sum of an array of m integers (m is taken as input from user, the array is then initialized randomly).

    If there are 2 threads, each thread computes the sum of half the array and adds the local sum to total sum (a global variable). The main thread should print the total sum (computed in parallel) and sum (computed sequentially by the main thread).

4. Write a C program using pthreads and semaphores to solve Cigarette Smoker's problem.
    Cigarette Smoker's problem:
    Three smokers are sitting around a table, and each smoker has an infinite supply of one of the three ingredients required to make a cigarette:
    - Smoker 1 has tobacco
    - Smoker 2 has paper
    - Smoker 3 has matches

    An agent places two random ingredients on the table. The smoker who has the third missing ingredient picks up the items, makes a cigarette, smokes it, and then signals the agent to place the next two items.