

Problem given in a previous exam:

Students decide to meet and go watch a movie.

After they gather together in groups of `group_size`, they go buy tickets. Each student buys his own ticket (becomes a customer). There are two ticket-booths (each booth has one clerk). If the clerk is available it will serve the next customer on line (one customer at a time). There is only one line for both booths.

Using **semaphores** and **operations on semaphores**, synchronize the two thread types: **Student** and **Clerk**. There are **numStudents** (default 9) and **numClerks** (default 2). Consider that there are no customers on line at the booth in the early morning. From the clerk's point of view (it is up to you) you can consider that both clerks were already at work or that neither of them has arrived yet (when the first customer showed up). There are more customers than **numStudents**.

Give the **type**, **initial value** of **each semaphore used**, and shortly **explain its use**.

Don't use Boolean variables if their use can be replaced by semaphores.

Roughly before the synchronization, a possible execution pseudo-code for the threads might be:

```
Student () {
    arrive to meeting place // napping
    group together
    go buy ticket

    buy ticket              //napping
    watch movie             // napping
}

Clerk () {
    get to workplace        // napping
    while(true) {
        serve customer      // if  $\exists$  a
                             customer
    }
}
```