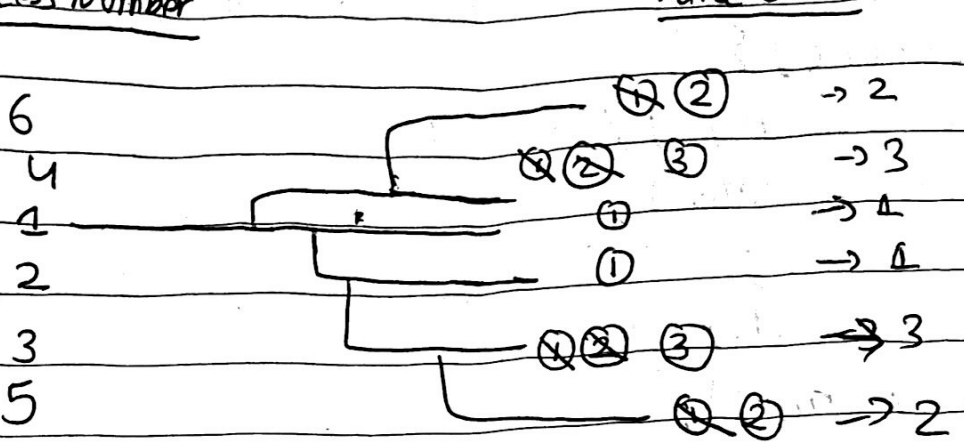
OS 2020 Problem Sheet #3.
Mahiem Agrawal

Problem 3.1



a) ~~Initially~~ ~~there is~~ There are 6 processes ~~The process creates~~ created during execution.

b) The output produced is two sets of processes will have value 1, another 2 will have value 2, and another 2 will have 6. The order will not matter as they ~~can be produced~~ ~~diff~~ are all run concurrently.

Problem 3.2

a) The problem in this program is that the conditional check taking place in the second last line. when the readcount becomes 0 and leaves the critical region.

But in this same instance if another reader comes in the readcount will be 1. ~~therefore~~ Then the down(writer) will be =1 so neither can the reader read nor can the write write as well. leading to a deadlock.

b) I feel its the same problem taking place that of question 1 The readcount ~~st~~ if statement is outside the critical section which will create the same problem as that of nomber a).

c) This question has a problem with the down(mutex) in the writer section here.

There will be an error if now a reader enters downs (the) mutex) and if he was the only one increases the readcount to 1

At that time if another writer comes in he does the down (@write) Now neither can the reader read as he is waiting for the writer finish and the writer cant write as he first needs to enter that critical region creating a deadlock.

Problem 3.3

```
semaphore_t turnstile1 = 0;
semaphore_t mutex = 1;
semaphore_t chips = N;
int count = 0;

runner() {
    down(&chips)
    run();
    up(&chips)
}

relay(){
    down(&mutex);
    count ++
    IF(count == T) {
        FOR(int j=0; j<T; j++) {
            up(Turnstile1);
            down(&chips);
            run();
        }
    count = 0;
    }
up(&mutex);
down(turnstile1;)
up(&chips)
}
```

How my program works is for a runner it is pretty simple. If there is available chips he will simply entor critical region and run. If not he will be waiting.

For the relay I have implemented like a barrier. Only if T number of runners reach will they get the chip or else they will simply wait as the barrier wont let them go.