Question 3. Scheduling [10 Marks]

There are four processes in the system. Two processes, A and B, are CPU-bound processes that are always runnable. The other two processes, X and Y, are IO-bound processes that run for 0.1 seconds and then block for 0.5 seconds. After blocking, they become runnable again.

Part (a) [5 Marks] Show how the four processes are scheduled by a round-robin scheduler. The time slice of the scheduler is 0.1 seconds. Start by scheduling processes X, Y, A and B, as shown below. Show the process that is running in each time slice for the first 20 time slices. Assume that a process becomes runnable just before the arrival of a timer interrupt.

```
1  2  3  4  5  6  7  8  9  10
X  Y  A  B
11 12 13 14 15 16 17 18 19 20
```

Part (b) [5 Marks] Show how the four processes are scheduled by a Unix-style feedback scheduler. Assume that timer interrupts arrive every 0.1 seconds and the time slice of the scheduler is 1 second. Start by scheduling processes X and Y as shown below. Assume that all processes have the same nice value.

```
1  2  3  4  5  6  7  8  9  10
X  Y
11 12 13 14 15 16 17 18 19 20
```