EE416 Quiz 1 2009

I held the first class quiz at the start of the second hour on Wed 10-28-2009. The class TA will record the grades, I did the grading. There are no makeups.

Grades are either 0,1, 3, or 5 out of 5 points. About 10 minutes were allocated to the solution.

The question called for analyzing a short MATLAB code:

```
>> %enter a value of t, 0<t<1
>> u = rand;%unif(0,1)
>> if (u > t);y=1;end
>> if (u <= t);y=2;end
>> y
```

The question was to provide a labeled sketch of the PMF of RV y.

(Hopefully my memory is correct, and I did not switch the inequality. Otherwise, the result for P_1, P_2 given below must be switched.)

I was intending this to be a straightforward quiz. However, a number of people, could not compute the probabilities correctly, or determine PMF. I think that the PMF concept was not clear to them.

A PMF is a list of probabilities for a discrete random variable, ordered according to the outcomes.

Solution. RV y can take on 2 values, y = 1, and y = 2. The PMF is the probability of each and every outcome of y. Call this

$$P_k = P\{y = k\}, \ k = 1, 2$$

Note that $P_1 + P_2 = 1$. We find that

$$P_1 = P\{y = 1\} = P(u > t) = 1 - t$$

So that by total probability, $P_2 = t$.

The grading required that you determine the correct PMF. Also you should have known how to display the PMF, a sketch of P_k vs k.

This is a just a sketch of

$$P_k = P_1 \delta_{k-1} + P_2 \delta_{k-2}$$

for the above P_1, P_2 .

I am not including the sketch in these solutions, but it can be drawn in MATLAB using
>> plot([1 2], [1-t t],'r*');