Assignment 2. Solution.

1. Binomial distribution.

(i). Since the probability of failure is 2%. So $p = 0.98$. $q = 0.02$.

$$Pr(4;4,0.98) = \binom{4}{4}(0.98)^4(0.02)^0 = 0.922.$$

(ii). To make sure the total quiz score is <u>at least</u> 85%. 17 questions should be correct.

$$Pr(x \geq 7) = \binom{10}{7}(0.5)^7(0.5)^3 + \binom{10}{8}(0.5)^8(0.5)^2$$

$$+ \binom{10}{9}(0.5)^9(0.5)^1 + \binom{10}{10}(0.5)^{10}(0.5)^0 = 0.172.$$

2. Poisson distribution.

In this question. it is stated that from 8am ~ 12am most of you regard this as 12pm instead. Both case are correct for this time.

6 Customers per 240 min.

if we use 15 min as a packet.

$$\mu = \frac{6}{240/15} = \frac{3}{8}.$$

$$Pr = \frac{\mu^x}{x!}e^{-\mu} = \frac{1}{2}\left(\frac{3}{8}\right)^2 e^{-\frac{3}{8}} = 0.0483.$$

3. Availability.

$$\text{Availability} = \frac{MTTF}{MTTF+MTTR} = 0.99.$$

$$0.99(MTTF+MTTR) = MTTF.$$

$$0.99\,MTTR = 0.01\,MTTF.$$

# of failure	MTTF	MTTR.
1	15	0.15
2	10	0.1
3	7.5	0.08.
4	6	0.06
5	5	0.05
6	4.3	0.043.
7	3.75	0.038.
8	3.33.	0.033
9	3	0.03
10.	2.7.	0.027.