Quiz 1

1. Draw the boxplot using the following data:
52 40 60 55 75 70 90 85 90 85 94 92 95 94 100 98 125 125 115

2. Construct a stem-and-left display for the following data:
59 72 73 63 81 68 70 76 68 65 70 63 79 90 82 87 78 97 74 77 97 78 77

3、A company has 7 senior and 5 junior officers. An ad hoc legislative committee is to be formed. In how many ways can a 4-officer committee be formed so that it is composed of
(A) How many 4-office committees with 1 senior officer and 3 junior officers can be formed?
(A) How many 4-office committees with 4 junior officers can be formed?
(C) How many 4-office committees with at least 2 junior officers can be formed?

4. Denote the six elementary events {1}, {2}, …, {6} associated with tossing a six-sided die once by E1,E2, …, E6. If the die is constructed so that any of the three even outcomes is twice as likely to occur as any of the three odd outcomes (unfair die).
(A) What's the probability of elementary events?
(B) Let A be the event that outcome is even, what's P(A)?
(C) Let B be the event that outcome <=3, what's P(B)?

5. Consider the system illustrated in Fig. 1, Let A_i denote the event that the lifetime of cell i exceeds a particular lifetime value t_0 (i = 1, 2, . . . , 6). We assume that the A_i's are independent events and that $P(A_i)$ = 0.9 for every i since the cells are identical. What is the probability that the system lifetime exceeds t_0?

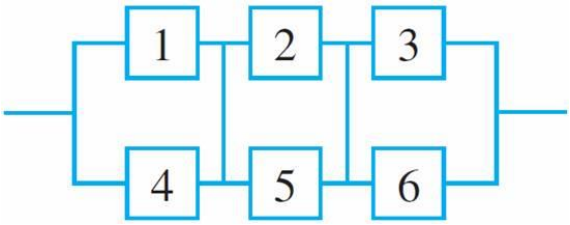


Fig. 1 System configuration

6. A news magazine publishes three columns entitled "Art"(A), "Books"(B), and "Cinema"(C). Reading habits of a randomly selected reader with respect to these columns are

Read regularly	A	B	C	$A \cap B$	$A \cap C$	$B \cap C$	$A \cap B \cap C$
Probability	0.14	0.23	0.37	0.08	0.09	0.13	0.05

Find:
(A) P(A|B) (B) P(A|B ∪ C) (C) P(A|A ∪ B ∪ C) (D) P(A ∪ B|C)

7、Suppose that we have a fuse box containing 20 fuses, of which 5 are defective. If 2 fuses are selected at random and removed from the box is succession without replacing the first, what is the probability that both fuses are defective?

8、In a certain assembly plant, three machines, B1, B2, and B3, make 30%, 45%, and 25%, respectively, of the products. It is known from past experience that 2%, 3% and 2% of the products made by each machine, respectively, are defective. Now, suppose that a finished product is randomly selected.

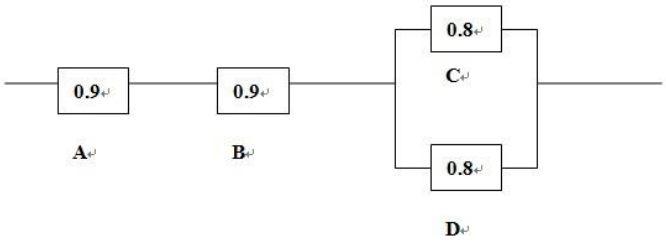
(A) What is the probability that it is defective?

(B) If a product were chosen randomly and found to be defective, what is the probability that it was made by machine B2 ?

9. An electrical system consists of four components as illustrated in following figure. The system works if components A and B work and either of components C or D work. The reliability (probability of working) of each component is also shown in the Figure. Assume that four components work independently.

(A) Find the probability that the entire system works.

(B) Find the probability that the component C does not work, given that the entire system works.



10. Only 1 in 1000 adults is afflicted with a rare disease for which a diagnostic test has been developed. The test is such that when an individual actually has the disease, a positive result will occur 99% of the time, whereas an individual without the disease will show a positive test result only 2% of the time. If a randomly selected individual is tested and the result is positive, what is the probability that the individual has the disease?

11. Consider a group of five potential blood donors—A,B,C,D, and E—of whom only A and B have type O+ blood. Five blood samples, one from each individual, will be typed in random order until an O+ individual is identified. Let the rv Y= the number of typings necessary to identify an O+ individual.

（A） Find the probability mass function (pmf) of Y.

（B） Find cumulative distribution function (cdf) of Y.

（C） Find expect value of Y.

（D） Find the variance of Y

12.The general form for the pmf of X=number of children born up to and including the first boy is

$$p(x)=\begin{cases} p(1-p)^{x-1} & x=1,2,3,\cdots \\ 0 & otherwise \end{cases}$$

（A） What is cdf of X ?

（B） What is expected value of X ?

13. A computer store has purchased three computers of a certain type at $500 apiece. It will sell them for $1000 apiece. The manufacturer has agree to repurchase any computers still unsold after specified period at $200 apiece.

Let X denote the number of computers sold, and suppose that p(0)=0.1, p(1)=0.2, p(2)=0.3 and p(3)=0.4. The h(x) denoting the profit associated with selling X units.

(A) What is the profit?

(B) What is expected profit?

(C) What is the variance and deviation of profit?

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