

Binary Game 1

Seven buildings are located in an urban development.

Three of the buildings are residential; the other four are commercial.

Each of the residential buildings is made of either brick or wood.

Each of the commercial buildings is made of either wood, concrete, brick, or steel.

All of the residential buildings and all of the brick buildings have fire escapes, but no other buildings do.

Exactly four of the buildings have fire escapes.

1. Which of the following must be true?
 - I. At least one of the buildings is made of wood.
 - II. At least one of the buildings is made of steel.
 - III. At least one of the buildings is made of brick.

(A) I only
(B) II only
(C) III only
(D) I and II only
(E) I and III only
2. If exactly two of the commercial buildings are made of concrete, then which one of the following must be true?

(A) At least one of the commercial buildings is made of wood.
(B) Exactly two buildings are made of wood.
(C) Exactly one of the commercial buildings is made of steel.
(D) No commercial building is made of wood.
(E) At most one building is made of steel.
3. If there is at least one wooden building, one concrete building, one brick building, and one steel building, then which one of the following must be false?

(A) Exactly four buildings are made of brick.
(B) Exactly three buildings are made of wood.
(C) Exactly two buildings are made of wood and exactly two buildings are made of steel.
(D) Exactly two buildings are made of steel and exactly two buildings are made of concrete.
(E) Exactly two buildings are made of wood and exactly two buildings are made of brick.
4. If there are exactly three brick buildings and one steel building, then any of the following can be true EXCEPT:

(A) there is exactly one wooden building
(B) there are no wooden buildings
(C) there are exactly three wooden buildings
(D) there are no concrete buildings
(E) there are exactly two concrete buildings
5. If exactly half of the buildings with fire escapes are wooden, then which one of the following must be false?

(A) There are more wooden buildings than brick buildings.
(B) There are more steel buildings than wooden buildings.
(C) There are exactly three wooden buildings.
(D) There are exactly three brick buildings.
(E) The number of steel buildings is equal to the number of concrete buildings.
6. If as many as possible of the buildings with fire escapes are wooden, then which of the following must be true?
 - I. There are exactly three wooden buildings.
 - II. There is exactly one brick building.
 - III. There are fewer concrete buildings than wooden buildings.

(A) I only
(B) II only
(C) I and III only
(D) II and III only
(E) I, II, and III

Binary Game 2

A group of four items is selected from seven items—G, H, I, J, K, L, and M—according to the following rules:

Either G or I must be selected.

Either H or K must be selected.

Neither K nor I can be selected with H.

Neither L nor G can be selected unless the other is also selected.

7. Which of the following groups is an acceptable selection of the items?
- (A) G, I, L, M
 - (B) I, K, M, H
 - (C) G, K, I, M
 - (D) G, L, J, M
 - (E) I, G, K, L
8. Which of the following groups of items cannot be among the items selected?
- (A) H, J
 - (B) H, J, M
 - (C) L, K, I
 - (D) G, H, M
 - (E) L, H, J
9. If I and M are selected, which of the following items must also be selected?
- (A) G, L
 - (B) J, H
 - (C) H
 - (D) K, J
 - (E) L
10. There would be only one possible way to select the four items if which of the following restrictions were added to the original set of conditions?
- (A) If I is selected, then G is selected.
 - (B) Both I and G are selected.
 - (C) If J is selected, then M is selected.
 - (D) Either L or M is selected.
 - (E) If I is selected, then K is selected.

Binary Game 3

Each of seven judges voted for or else against granting Datalog Corporation's petition. Each judge is categorized as conservative, moderate, or liberal, and no judge is assigned more than one of those labels. Two judges are conservatives, two are moderates, and three are liberals. The following is known about how the judges voted:

If the two conservatives and at least one liberal voted the same way as each other, then both moderates voted that way.

If the three liberals voted the same way as each other, then no conservative voted that way.

At least two of the judges voted for Datalog, and at least two voted against Datalog.

At least one conservative voted against Datalog.

- (E) All three liberals voted for Datalog.
11. If the two moderates did not vote the same way as each other, then which one of the following could be true?
- (A) No conservative and exactly two liberals voted for Datalog.
 - (B) Exactly one conservative and exactly one liberal voted for Datalog.
 - (C) Exactly one conservative and all three liberals voted for Datalog.
 - (D) Exactly two conservatives and exactly one liberal voted for Datalog.
 - (E) Exactly two conservatives and exactly two liberals voted for Datalog.
12. Which one of the following must be true?
- (A) At least one conservative voted for Datalog.
 - (B) At least one liberal voted against Datalog.
 - (C) At least one liberal voted for Datalog.
 - (D) At least one moderate voted against Datalog.
 - (E) At least one moderate voted for Datalog.
13. If the three liberals all voted the same way as each other, which one of the following must be true?
- (A) Both moderates voted for Datalog.
 - (B) Both moderates voted against Datalog.
 - (C) One conservative voted for Datalog and one conservative voted against Datalog.
 - (D) One moderate voted for Datalog and one moderate voted against Datalog.
 - (E) All three liberals voted for Datalog.
14. If exactly two judges voted against Datalog, then which one of the following must be true?
- (A) Both moderates voted for Datalog.
 - (B) Exactly one conservative voted for Datalog.
 - (C) No conservative voted for Datalog.
 - (D) Exactly two liberals voted for Datalog.
 - (E) Exactly three liberals voted for Datalog.
15. Each of the following could be a complete and accurate list of those judges who voted for Datalog EXCEPT
- (A) two liberals
 - (B) one conservative, one liberal
 - (C) two moderates, three liberals
 - (D) one conservative, two moderates, two liberals
 - (E) one conservative, two moderates, three liberals
16. If the two conservatives voted the same way as each other, but the liberals did not all vote the same way as each other, then each of the following must be true EXCEPT:
- (A) Both conservatives voted against Datalog.
 - (B) Both moderates voted for Datalog.
 - (C) At least one liberal voted against Datalog.
 - (D) Exactly two liberals voted for Datalog.
 - (E) Exactly five of the judges voted against Datalog.