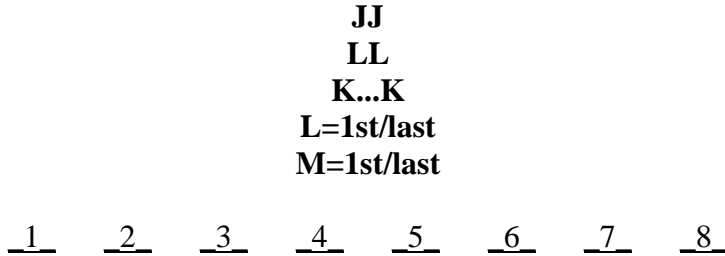


Hybrid Game # 1

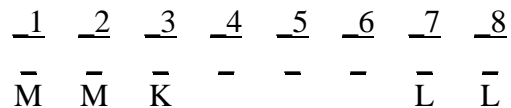
This is a relatively easy hybrid game. Begin by symbolizing the conditions. The conditions “*J and J are holding hands*” and “*L and L are holding hands*” are naturally symbolized as **JJ** and **LL**, respectively. The condition “*K and K are not holding hands*” can be symbolized as **K...K**. [The symbol $\sim(KK)$ would also work well, but the symbol **K...K** is more descriptive because it shows the space between the Ks.] The condition “*One of the Ls is at one end of the line, and one of the Ms is at the other end*” can be symbolized as **L=1st/last** and **M=1st/last**. The diagram will consist of eight dashed lines numbered 1 through 8, from left to right:



No significant conditions can be derived from the given information, and no conditions can be placed on the diagram. So we attack the questions.

1. If M is at position 2 and K is at position 3, then a J must be at position

- (A) 1
 (B) 4
 (C) 6
 (D) 7
 (E) 8



This yields two possible positions for the condition **JJ**:

Diagram I

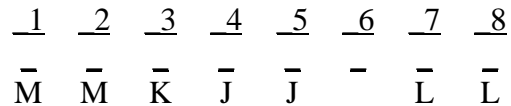
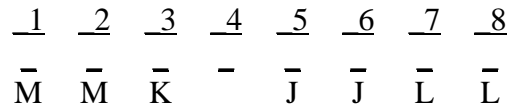
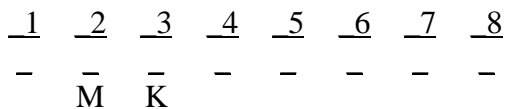


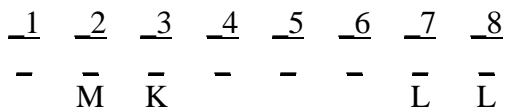
Diagram II



To start, place M and K at positions 2 and 3, respectively:



From the conditions **LL** and **L=1st/last**, we see that the Ls must be in positions 7 and 8, since M is in position 2:



Now the condition **M=1st/last** forces the other M into position 1:

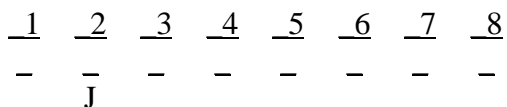
Diagram II is impossible, though, because it forces the Ks next to each other, violating the condition **K...K**. Thus Diagram I, which has the Js in positions 4 and 5, is uniquely determined by the conditions. The answer is (B).

2. If a J is in position 2, it must be true that
 (A) M is in position 3.

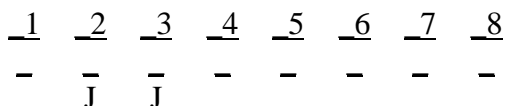
©Prep101

- (B) J is in position 4.
- (C) K is in position 7.
- (D) L is in position 5.
- (E) M is in position 5.

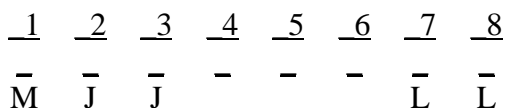
Place a J in position 2:



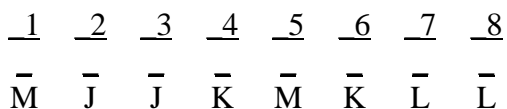
Then, from the condition **JJ**, the other J must be in position 3, since only L or M can be first.



Next, since the Ls must be together and one of them must be either first or last, they must be in positions 7 and 8. This in turn forces M to be first:



Next, from the condition **K...K**, we see that the Ks must be in positions 4 and 6, which in turn forces the other M into position 5. Thus our uniquely determined diagram is

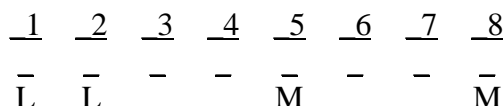


The answer is (E).

3. If an M is in position 8, which of the following CANNOT be true?
- I. The other M is in position 5.
 - II. The Ks can be in positions 3, 5, or 7.
 - III. One of the Js is in position 3.
- (A) I only
 - (B) II only
 - (C) III only
 - (D) II and III only
 - (E) I, II, and III

This question requires an indirect proof. That is, take a sub-statement; then try to construct a valid diagram for it. If this cannot be done, it is an answer—otherwise it is not.

Start with Statement I. If M is in position 5, then, from the supplemental condition “*M is in position 8*” and the condition **L=1st/last**, we know that the Ls must be in positions 1 and 2:



Now, the condition **JJ** forces the Js into either positions 3 and 4, or 6 and 7:

Diagram I

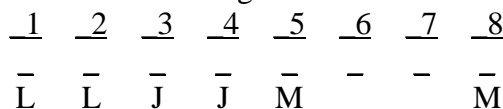
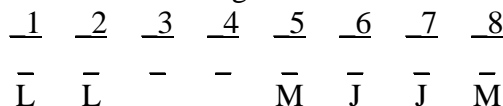


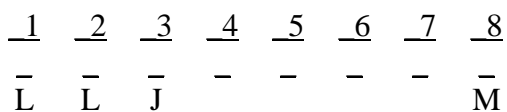
Diagram II



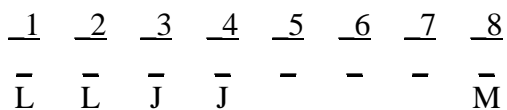
In both diagrams, the Ks are forced next to each other, which violates the condition **K...K**. Hence, Statement I cannot be true.

This eliminates (B), (C), and (D), as they don't contain I.

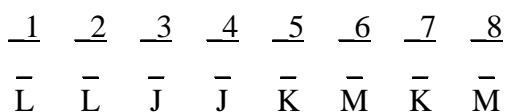
Next, Statement II is time consuming because we will have to check all three positions for the Ks. So skip to Statement III. Place J in position 3:



Then from the condition **JJ**, we know that the other J must be in position 4:



Then the Ks can be placed in positions 5 and 7 and the M in position 6—all without violating any conditions:



This is a valid diagram with J in position 3. Hence, Statement III *can* be true. This eliminates (E). Therefore, by process of elimination, we have learned that the answer is (A), without having to check Statement II.

4. If the Ks are separated by at most one other person, then which one of the following groups could be standing in the four even-numbered positions in one arrangement?
- (A) The two Js and the two Ls.
 - (B) The two Ks and the two Ls.
 - (C) The two Js and the two Ms.
 - (D) One J, one K, one L, and one M.
 - (E) One J, the two Ks, and one L.

This is a moderately hard problem. The condition “*the Ks are separated by at most one other person*” is somewhat obscure. It is

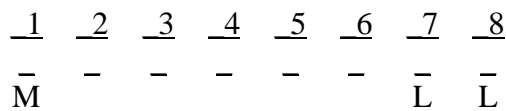
more clearly expressed as “*exactly one person separates the Ks.*”

Since the two Js must be next to each other, they cannot both be in even-numbered positions. This eliminates both (A) and (C). The same is true for the Ls, which eliminates (B).

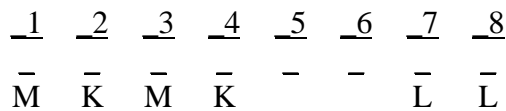
Since the Ks are separated by exactly one person, they must either both occupy even-numbered positions or both occupy odd-numbered positions. But choice (D) places only one K in an even-numbered position. This eliminates (D).

As a matter of test-taking strategy, this is sufficient analysis of the question to mark the answer (E). However, it is instructive to work out a valid order for (E).

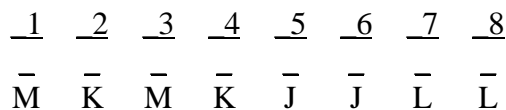
To this end, place an M in position 1 and the Ls in positions 7 and 8:



Next, place the Ks in positions 2 and 4, with M separating them:



Finally, place the Js in positions 5 and 6:



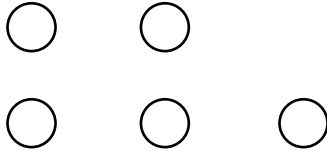
This diagram satisfies all the conditions, which verifies that (E) is the answer.

5. Which one of the following must be true?
- (A) At least one J is holding hands with a K.

©Prep101

Women Men
 L, M, N O, P
 (P is "wild")

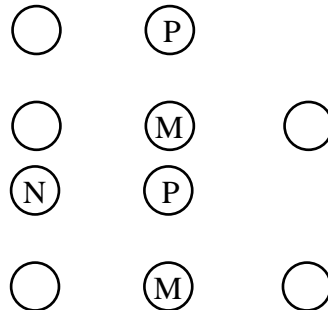
~(NM) and ~(NO)
 L<-/->N



6. If Mary plays Paul on the middle board and Paul does not sit between two other players, which one of the following is a complete and accurate list of those who might not have an opponent?

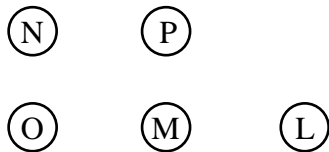
- (A) Laura
- (B) Naomi
- (C) Laura and Naomi
- (D) Laura and Oliver
- (E) Laura, Naomi, and Oliver

Adding the condition "Mary plays Paul on the middle board and Paul does not sit between two other players" to the diagram yields



Now N must sit next to P since she cannot sit next to M, [~(NM) and ~(NO)]. This yields

Next, the condition L<-/->N forces L to the right of M:



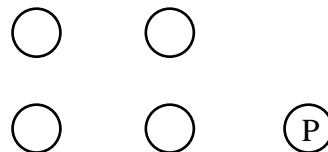
This diagram is uniquely determined by the conditions. Hence, L and only L will not have an opponent. The answer is (A).

7. If Paul does not have an opponent, which one of the following must be false?

Now, we try to construct a diagram for each answer-choice. The one for which this

- (A) Mary plays Naomi.
- (B) Mary plays Oliver.
- (C) Mary plays Laura.
- (D) Laura does not sit between two other people.
- (E) Laura sits between Naomi and Paul.

Adding the condition "Paul does not have an opponent" to the diagram yields



cannot be done will be the answer. Begin with (A). Place M and N on the diagram as follows:

Next, place O and L on the diagram as follows:

This diagram satisfies every condition. Hence, Mary can play Naomi. This eliminates (A).

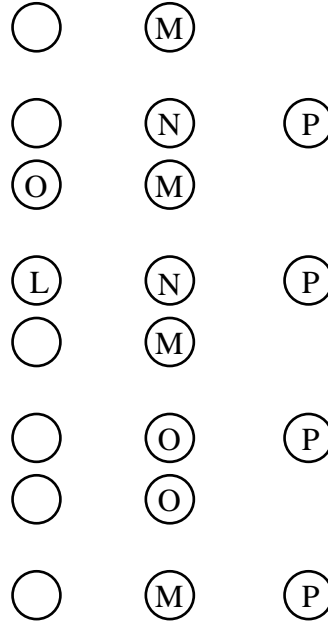
Choice (B) yields two possible diagrams:

Clearly, in either diagram N must sit next to either M or O. However, this violates the condition $\sim(NM)$ and $\sim(NO)$. Hence, Mary cannot play Oliver, and the answer is (B).

8. If players of the same sex do not play each other and Mary sits between two other players, which one of the following is a complete and accurate list of those players who might be Oliver's opponent?

(A) Mary and Laura

Since players of the same sex do not play each other, M must play either O or P. This generates two diagrams:



- (B) Mary and Naomi
- (C) Naomi
- (D) Mary, Naomi, and Laura
- (E) Mary

Adding the condition “*Mary sits between two other players*” to the diagram yields

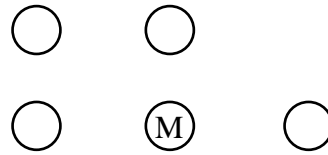


Diagram I

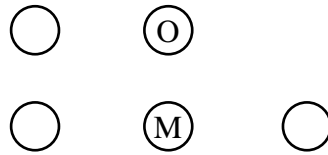


Diagram II

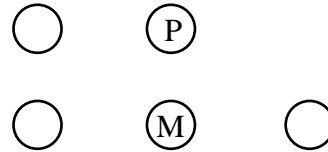
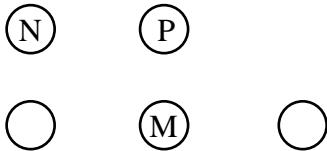


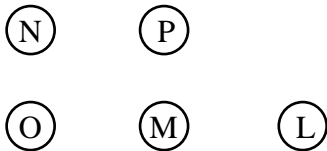
Diagram I is impossible since it forces N next to either M or O, violating the condition $\sim(NM)$ and $\sim(NO)$. In Diagram II, N must sit next to P since she cannot sit next to M:

Diagram II



Next, the condition $L \leftarrow / \rightarrow N$ forces L to the right of M and O to the left of M:

Diagram II

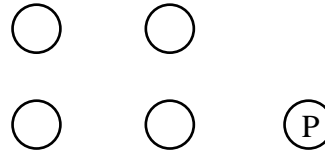


This diagram is uniquely determined by the conditions. Hence, only Naomi can play Oliver. The answer is (C).

9. If players of the same sex do not play each other, which one of the following must be false?
- (A) Naomi plays Paul.
 - (B) Naomi plays Oliver.
 - (C) Laura plays Oliver.
 - (D) Paul plays Mary.
 - (E) Paul does not have an opponent.

This type of problem can be time consuming because we may have to construct a separate diagram for each wrong answer. In these cases, you should quickly survey the answer-choices for a likely candidate and check whether any previous diagrams will help. Now, the final diagram in Question 8 shows that both (B) and (D) are possible. This eliminates

(B) and (D). Turning to (E), place P on the diagram:



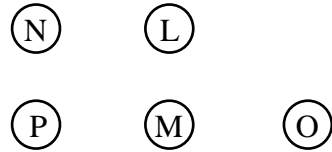
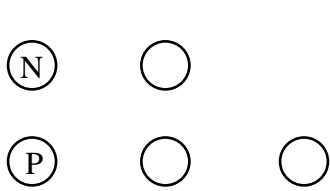
Now, there are three women but only four open seats in the diagram. Hence, two of the women must play each other, contradicting the condition “*players of the same sex do not play each other.*” The answer is (E).

10. If the women always play each other, which one of the following must be true?
- (A) Laura plays Mary.
 - (B) Mary plays Naomi.
 - (C) Laura has no opponent.
 - (D) One of the women does not have an opponent.
 - (E) Paul does not have an opponent.

Since the women must play each other and there are three women, one woman will not have an opponent. The answer is (D).

11. How many different people can Naomi play against?
- (A) 0
 - (B) 1
 - (C) 2
 - (D) 3
 - (E) 4

From the condition $L \leftarrow / \rightarrow N$, we know that Naomi cannot play Laura. This eliminates (E). The final diagram in Question 6 has Naomi playing Oliver, and the third diagram in Question 7 has Naomi playing Mary. Next, suppose Naomi plays Paul:



Now, Laura could play Mary, which leaves Oliver without an opponent:

This diagram satisfied every condition. Thus the correct answer is D

Hybrid Game # 3

This is a hybrid ordering / grid game.

1	2	3	4	5
			K	

And from the conditions presented we know that O f P g will fall somewhere on the grid in that order.

A final condition is that N must be in a lane to the left of S.

- 12. (A) No. This violates the condition “Patricia is assigned to the only lane between the lanes of the runners representing F and G,” indicating exactly one lane between F and G.
- (B) No. This violates the condition “Patricia is assigned to the only lane between the lanes of the runners representing F and G,” indicating exactly one lane between F and G.
- (C) No. This violates the condition “The runner representing K is assigned to lane 4.”
- (D) No. This violates the condition “There are exactly two lanes between Olivia’s lane and the lane of the runner representing G.”
- (E) Yes. This problem is best solved by elimination:

- 13. (A) No. The following assignment satisfies all the conditions and does not have Patricia next to Larry:

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
Larry	Olivia	Ned	Patric ia	Sonja
H	J	F	K	G

- (B) No. The following assignment satisfies all the conditions and does not have Patricia next to Ned:

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
Ned	Olivia	Larry	Patric ia	Sonja
H	J	F	K	G

- (C) No. The following assignment satisfies all the conditions and has Patricia separated from Ned by two lanes:

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
Ned	Patricia	Sonja	Olivia	Larry
G	H	F	K	J

(D) Yes. This problem is best solved by elimination:

The following valid assignment has Sonja representing F, so she must be included in the list:

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
Ned	Patricia	Sonja	Olivia	Larry
G	H	F	K	J

This eliminates both (A) and (C)—they don't include Sonja.

Next, the following valid assignment has Larry representing F, so he must be included in the list:

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
Ned	Olivia	Larry	Patricia	Sonja
J	H	F	K	G

This eliminates both (B) and (E)—they don't include Larry.

Hence, by process of elimination, the answer is (D).

(E) No. The following valid assignment has Larry representing F, so he must be included in the list:

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
Ned	Olivia	Larry	Patricia	Sonja
J	H	F	K	G

16. (A) No. The following valid assignment has the runner representing G assigned to lane 5:

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
Ned	Olivia	Larry	Patricia	Sonja
J	H	F	K	G

(B) Yes. This problem is best solved by elimination. The following valid arrangement is a counterexample to choices (A), (C), (D), and (E):

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
Ned	Olivia	Larry	Patricia	Sonja
J	H	F	K	G

Hence, by process of elimination, the answer is (B).

(C) No. The following valid assignment has Patricia representing K:

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
Ned	Olivia	Larry	Patricia	Sonja
J	H	F	K	G

(D) No. The following valid assignment has Larry representing F:

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
Ned	Olivia	Larry	Patricia	Sonja
J	H	F	K	G

(E) No. The following valid assignment has Patricia representing K:

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
Ned	Olivia	Larry	Patricia	Sonja
J	H	F	K	G

17. (A) Yes. In the following diagram, all 4 conditions are satisfied:

K is assigned to lane 4.
 Patricia is immediately between F and G.
 Exactly two lanes separate Olivia from G.
 Sonja is assigned a higher-numbered lane than Ned is.

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
Larry	Olivia	Ned	Patricia	Sonja
J	H	F	K	G

(B) No. This violates the condition “Patricia is assigned to the only lane between the lanes of the runners representing F and G.”

(C) No. This violates the condition “*Sonja is assigned to a higher-numbered lane than the lane to which Ned is assigned.*”

(D) No. Since Larry represents J and “*The runner representing K is assigned to lane 4,*” the assignment becomes

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
Ned	Olivia	Larry	Patricia	Sonja

J K

However, this diagram violates the condition “*Patricia is assigned to the only lane between the lanes of the runners representing F and G.*”

(E) No. This violates the condition “*There are exactly two lanes between Olivia's lane and the lane of the runner representing G.*”