

Recitation, Week 5

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The following statements are all **logically equivalent**:

The following statements are all **logically equivalent**:

- ▶ X is a sufficient condition for Y
- ▶ Y is a necessary condition for X
- ▶ when X does not occur, Y may still occur
- ▶ X implies Y
- ▶ If X then Y (or: Y if X)
- ▶ $X \rightarrow Y$ (or: $X \Rightarrow Y$)

The following statements are all **logically equivalent**:

The following statements are all **logically equivalent**:

- ▶ X is a necessary condition for Y
- ▶ X must be present for Y
- ▶ Y is a sufficient condition for X
- ▶ X is implied by Y
- ▶ Only if X then Y (or: Y only if X)

Necessity and Sufficiency

The following statements are all **logically equivalent**:

Necessity and Sufficiency

The following statements are all **logically equivalent**:

- ▶ X is a necessary and sufficient condition for Y
- ▶ Y is a necessary and sufficient condition for X
- ▶ X implies and is implied by Y
- ▶ X iff Y (or: Y iff X , or: X if and only if Y)
- ▶ $X \leftrightarrow Y$ (or: $X \Leftrightarrow Y$)

Group exercise

1. Attending UC Berkeley is _____
for attending a UC school.
2. Being at least 30 years old is
_____ for being in the U.S.
Senate.
3. It being July 4th is _____ for it
being Independence Day (in the United States).
4. Receiving an A in this class is
_____ for getting a good job.

Group exercise

1. Attending UC Berkeley is a sufficient condition for attending a UC school.
2. Being at least 30 years old is _____ for being in the U.S. Senate.
3. It being July 4th is _____ for it being Independence Day (in the United States).
4. Receiving an A in this class is _____ for getting a good job.

Group exercise

1. Attending UC Berkeley is a sufficient condition for attending a UC school.
2. Being at least 30 years old is a **necessary condition** for being in the U.S. Senate.
3. It being July 4th is _____ for it being Independence Day (in the United States).
4. Receiving an A in this class is _____ for getting a good job.

Group exercise

1. Attending UC Berkeley is a sufficient condition for attending a UC school.
2. Being at least 30 years old is a necessary condition for being in the U.S. Senate.
3. It being July 4th is a **necessary and sufficient condition** for it being Independence Day (in the United States).
4. Receiving an A in this class is _____ for getting a good job.

Group exercise

1. Attending UC Berkeley is a sufficient condition for attending a UC school.
2. Being at least 30 years old is a necessary condition for being in the U.S. Senate.
3. It being July 4th is a necessary and sufficient condition for it being Independence Day (in the United States).
4. Receiving an A in this class is **neither necessary nor sufficient** for getting a good job.