Quiz 1 – Propositional Logic

You have **1 days** to complete this quiz. Please ask me if you have any questions. Good luck!

- There are 2 pages in this quiz. Make sure you have all of them.
- This quiz is open-note and open-book, however, all answers must be an individual effort.

1. Let *p* and *q* be the statements:
   - *p*: "Swimming at the shore is allowed."
   - *q*: "Sharks have been spotted near the shore."

   Express each of the following propositions as an English sentence:

   (a) $\neg q \rightarrow p$
   If sharks have not been spotted near the shore, then swimming at the shore is allowed.

   (b) $\neg q \vee (\neg p \wedge q)$
   Sharks have not been spotted near the shore, or swimming is not allowed at the shore and sharks have been spotted near the shore.

2. Let *p*, *q*, and *r* be the statements:
   - *p*: "You ace the final exam."
   - *q*: "You do every exercise in the book."
   - *r*: "You get an 'A'."

   Write each of the following statements using *p*, *q*, *r*, and the logical operators:

   (a) "You ace the final exam but don't do every exercise in the book; nevertheless, you get an 'A'."
   $\boldsymbol{(p \wedge \neg q) \wedge r}$

   (b) "You will get an 'A' if and only if you either do every exercise in the book or ace the final exam."
   $\boldsymbol{r \leftrightarrow (q \vee p)}$

3. Rewrite each of the following propositions in the form "If… then…":
   (a) "That you got the job implies that you had the best credentials."
   If you got the job, then you had the best credentials.

   (b) "Having a valid password is necessary in order to login to the server."
   If you can login to the server, then you have a valid password.

4. Construct a truth table to determine the truth values of the following proposition:

$$(p \vee q) \rightarrow (p \wedge q)$$

p	q	$(p \vee q)$	$(p \wedge q)$	$(p \vee q) \rightarrow (p \wedge q)$
T	T	T	T	**T**
T	F	T	F	**F**
F	T	T	F	**F**
F	F	F	F	**T**