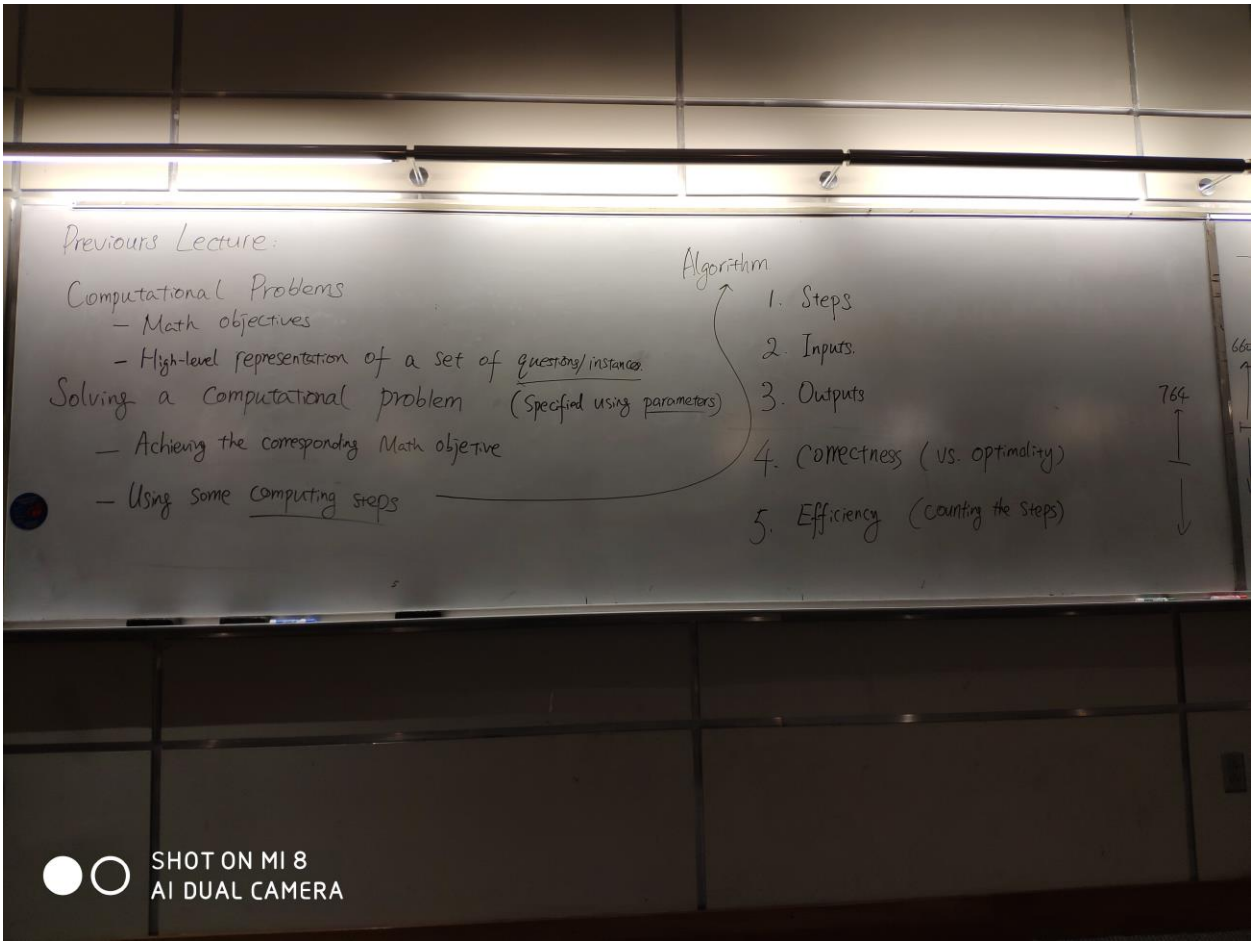
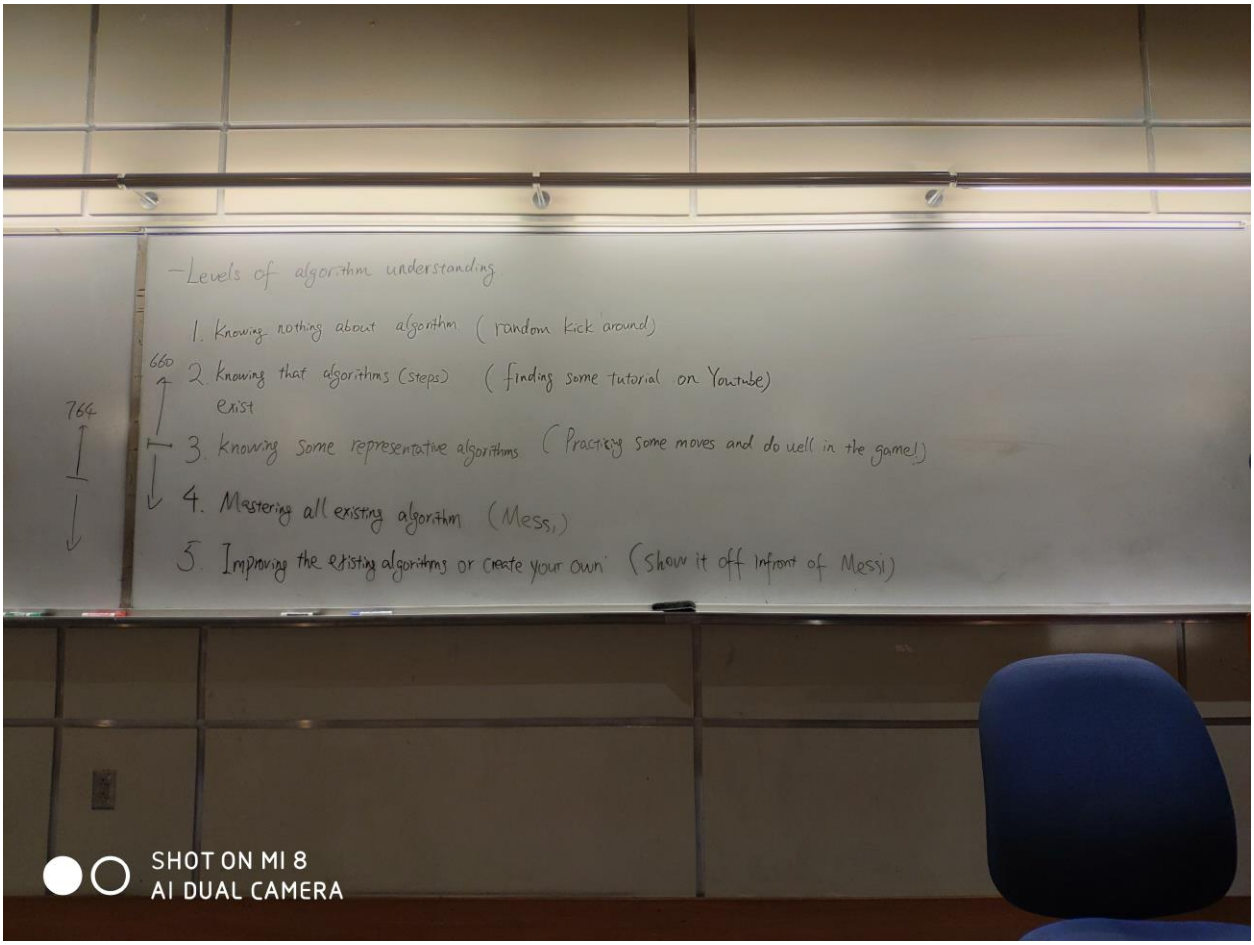

Previours Lecture:
Computational Problems
– Math objectives
– High-level representation of a set of questions/instances
Solving a computational problem (Specified using parameters)
– Achieving the corresponding Math objective
– Using some computing steps
Algorithm
1. Steps
2. Inputs.
3. Outputs
4. Correctness (vs. optimality)
5. Efficiency (counting the steps)
764
SHOT ON MI 8
AI DUAL CAMERA


-Levels of algorithm understanding
1. Knowing nothing about algorithm (random kick around)
660
2. Knowing that algorithms (steps) exist (finding some tutorial on Youtube)
764
3. Knowing some representative algorithms (Practicing some moves and do well in the game!)
4. Mastering all existing algorithm (Messi)
5. Improving the existing algorithms or create your own (Show it off infront of Messi)
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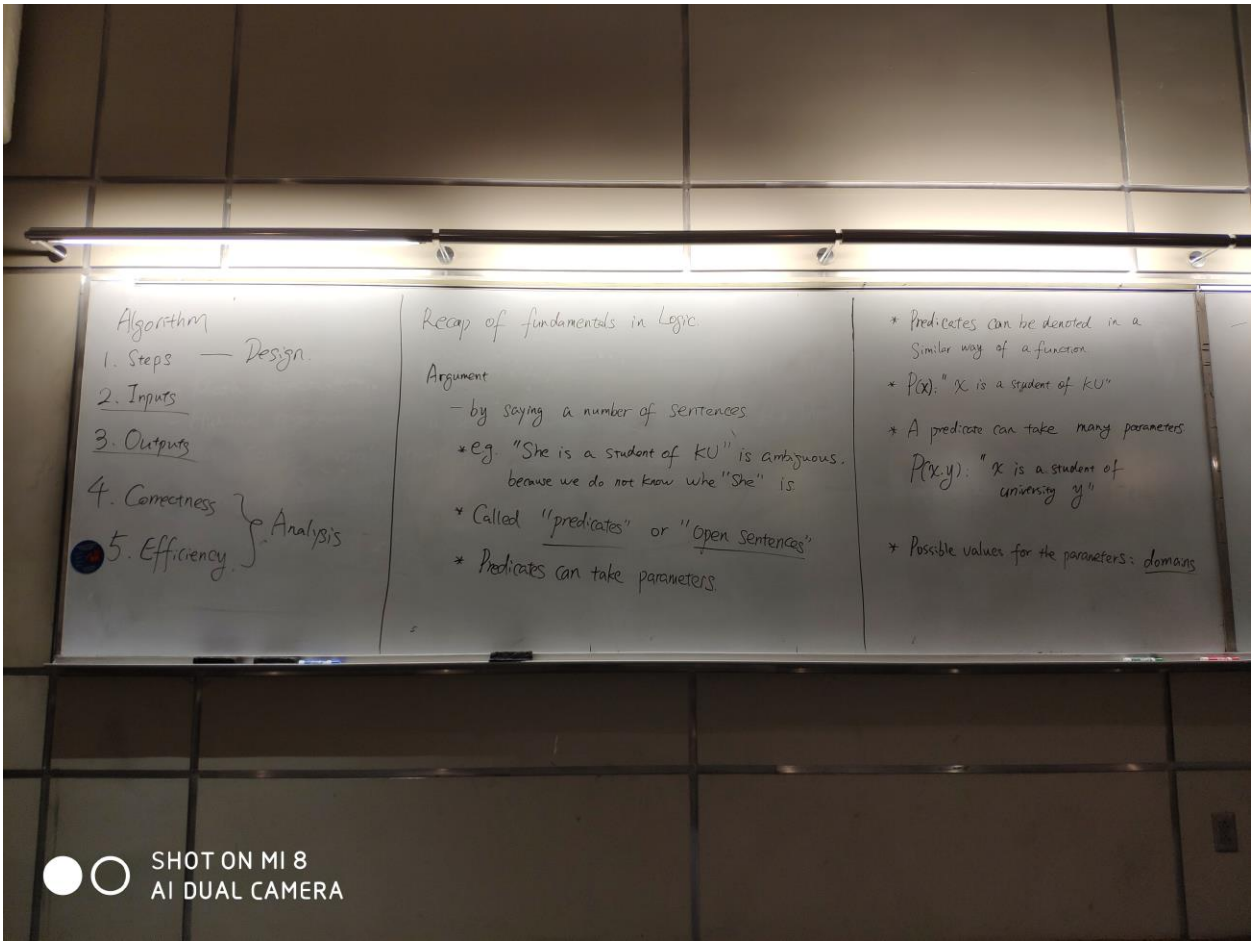
Algorithm
1. Steps — Design
2. Inputs
3. Outputs
4. Correctness
5. Efficiency
Analysis
Recap of fundamentals in Logic
Argument
- by saying a number of sentences
* e.g. "She is a student of KU" is ambiguous, because we do not know who "She" is.
* Called "predicates" or "Open sentences"
* Predicates can take parameters.
* Predicates can be denoted in a similar way of a function
* P(x): "x is a student of KU"
* A predicate can take many parameters
P(x,y): "x is a student of university y"
* Possible values for the parameters: domains
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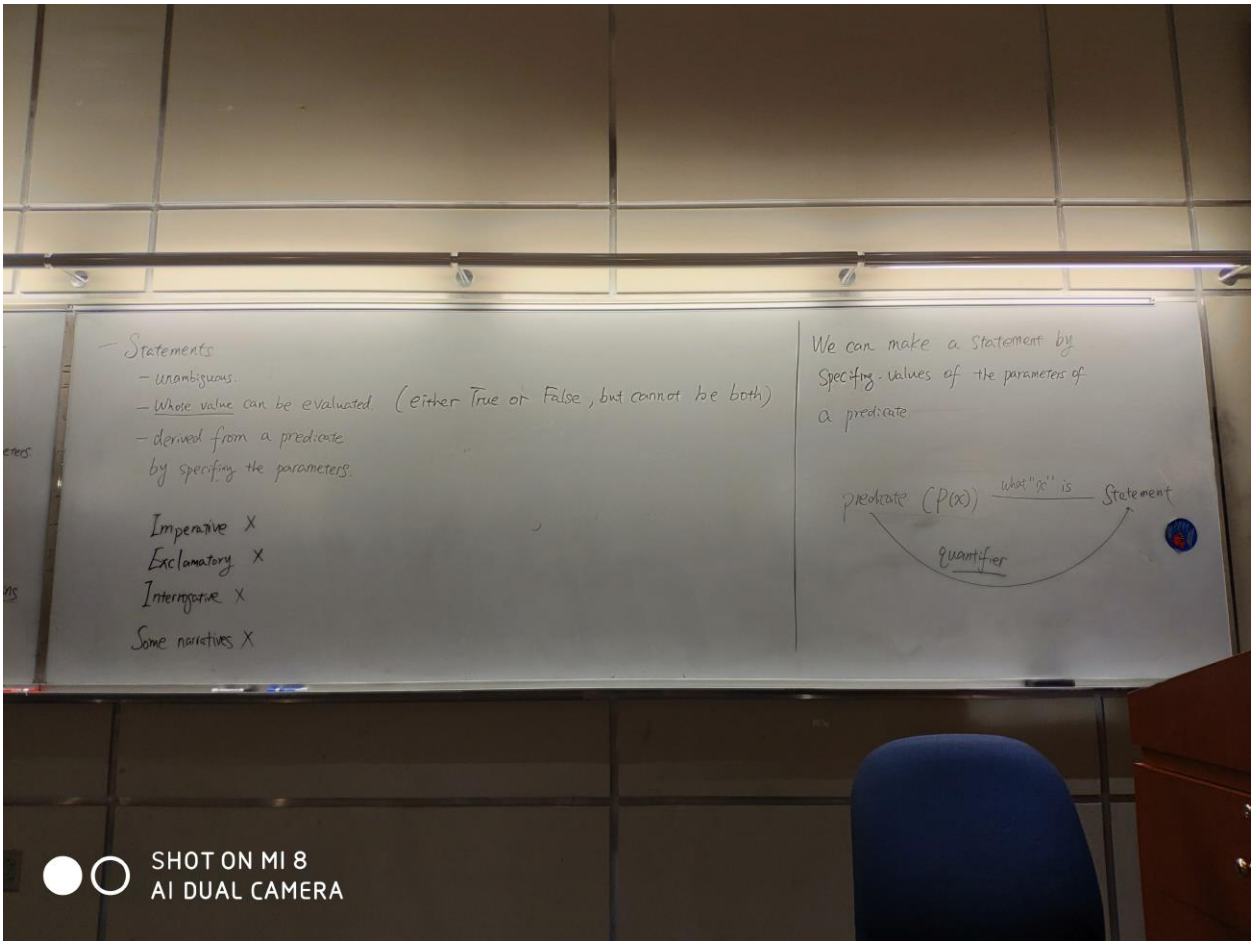
– Statements
– unambiguous.
– Whose value can be evaluated. (either True or False, but cannot be both)
– derived from a predicate by specifying the parameters.
Imperative X
Exclamatory X
Interrogative X
Some narratives X
We can make a statement by specifying values of the parameters of a predicate.
predicate (P(x))
what "x" is
Statement
quantifier
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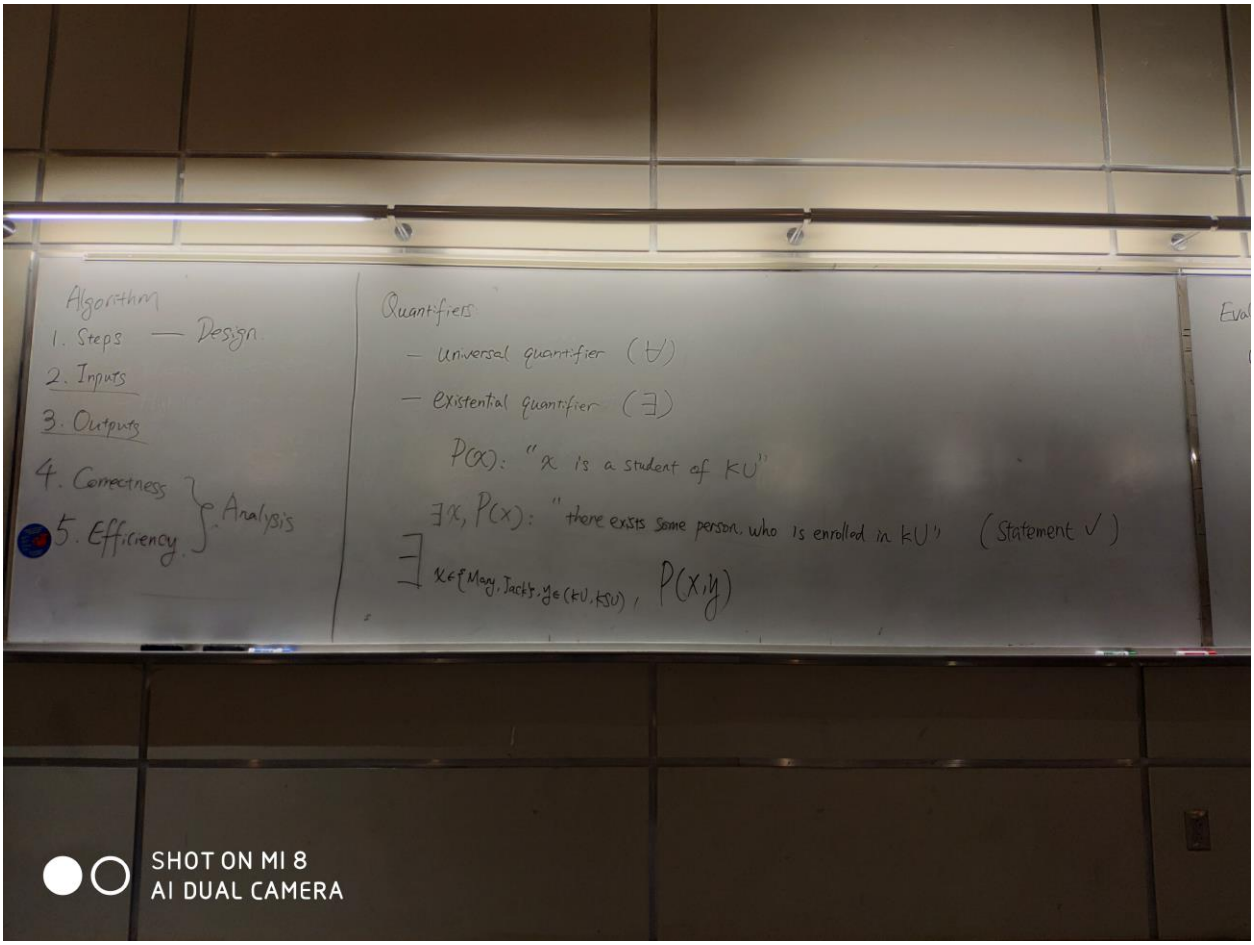
Algorithm
1. Steps — Design
2. Inputs
3. Outputs
4. Correctness
5. Efficiency
Analysis
Quantifiers
— Universal quantifier (∀)
— Existential quantifier (∃)
P(x): "x is a student of KU"
∃x, P(x): "there exists some person, who is enrolled in KU" (Statement ✓)
∃ x∈{Mary, Jack}, y∈(KU, KSU), P(x,y)
SHOT ON MI 8
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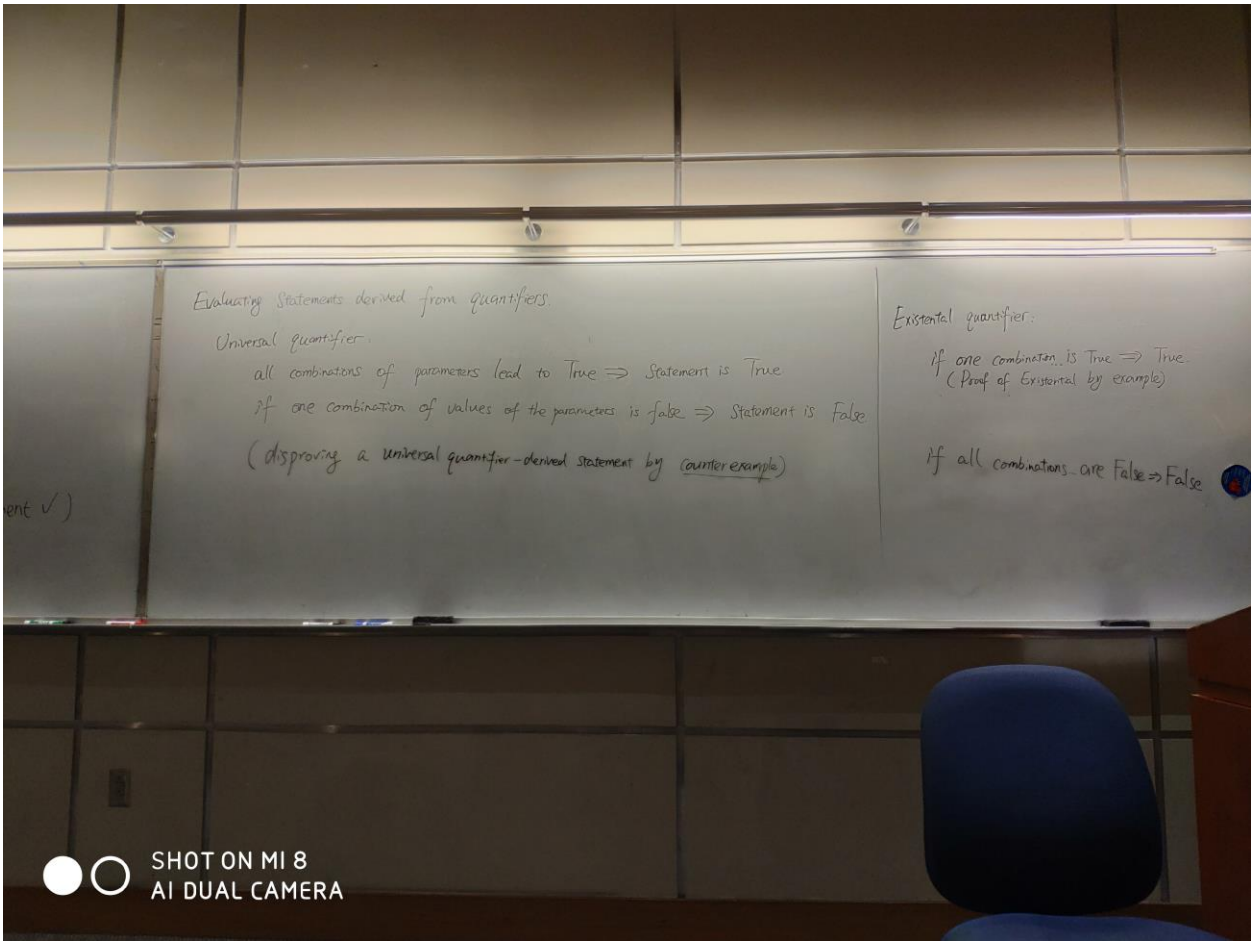
Evaluating Statements derived from quantifiers:
Universal quantifier:
all combinations of parameters lead to True ⇒ Statement is True
if one combination of values of the parameters is false ⇒ Statement is False
(disproving a universal quantifier-derived statement by counter example)
Existental quantifier:
if one combination is True ⇒ True
(Proof of Existental by example)
if all combinations are False ⇒ False
SHOT ON MI 8
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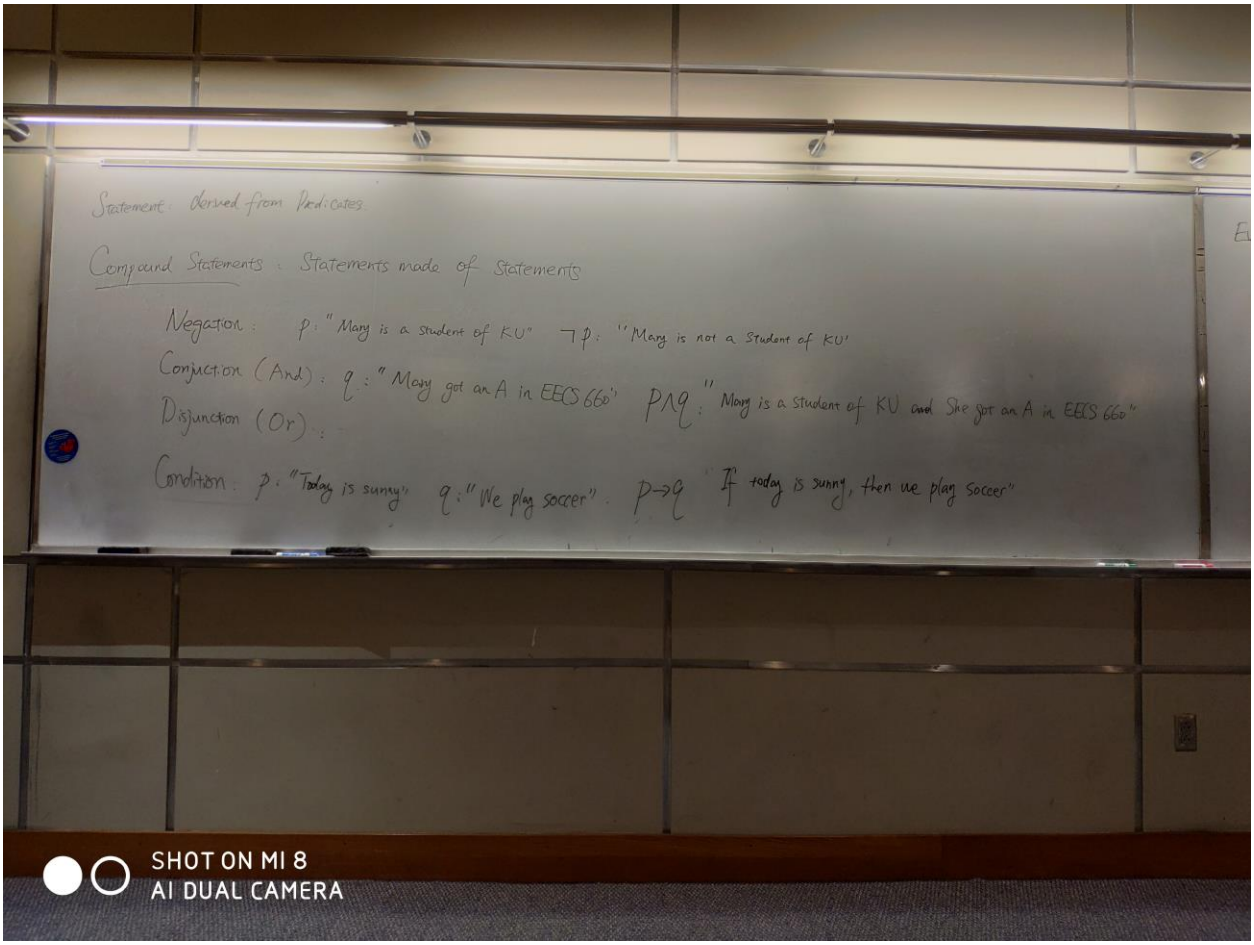
Statement: derived from Predicates
Compound Statements: Statements made of Statements
Negation: p: "Mary is a student of KU" ¬p: "Mary is not a student of KU"
Conjuction (And): q: "Mary got an A in EECS 660" p∧q: "Mary is a student of KU and She got an A in EECS 660"
Disjunction (Or):
Condition: p: "Today is sunny" q: "We play soccer" p→q "If today is sunny, then we play soccer"
SHOT ON MI 8
AI DUAL CAMERA