

Meet our Teaching Assistant: Wonbin Kim

Education:

SUNY Korea (Stony Brook), CS Major



Experiences:

- United Nations 6th SDG Youth Summer Camp Summer 2022
- Biology 201 TA Spring 2022
- JoongDaily journalism internship Winter 2021/2022
- Global Leaders Youth Forum 2022 mentor Summer 2022
- Rovigos (Artificial intelligence start-up) research and marketing intern Summer 2022
- Member of We are Here (Volunteering club)
- Treasurer for SKCS (SUNY Korea Computing Society)
- Residence Assistant for the 16th floor of dorm B

**The
JoongAng**

Korea JoongAng Daily

ROVIGOS

JOIN OUR CLUB: SUNY KOREA COMPUTING SOCIETY

- ❖ Great way of networking with ambitious people who plan to get into the tech industry
- ❖ Practice leetcodes problems with us
- ❖ Help us organize future Hackathons
- ❖ Great way to make friends (MT, Dinner, etc)
- ❖ Build personal projects with us
- ❖ Long history and heritage
- ❖ We collaborate with the SBU computing society at the New York Campus
- ❖ Application Form:
<https://forms.gle/LVE3tA6Cg4KppUNW9>



Contact Details and Office Hours

- Email: Wonbin.kim@stonybrook.edu
- Kakaotalk ID: Goodnightkafka
- Office Hours: Monday-Thursday 10 pm – 12 am at _____

CSE215: Lecture 05

Foundations of Computer Science

Instructor: Zhoulai Fu

State University of New York, Korea

September 7, 2022

Anonymous course feedback here:
<https://forms.gle/BjkiAUSUc3Fet9Rn6>

Today's Objectives

- A comprehensive coverage of related SBU exam problems in 2020 & 2021

To Finish 6 exercises by 4h25pm

2021 Final

Problem 1. [5 points]

Construct a truth table for the following statement form: $p \wedge (q \vee r) \leftrightarrow p \wedge (q \wedge r)$.

p	q	r	p AND (q OR r)	p AND (q AND r)	p AND (q OR r) \leftrightarrow p AND (q AND r)
T	T	T	T	T	T
T	T	F	T	F	F
T	F	F	F	F	T
T	F	T	T	F	F
F	T	T	F	F	T
F	T	F	F	F	T
F	F	F	F	F	T
F	F	T	F	F	T

Errata: row #2 (T T F row), column “p AND (q AND r)” should be F, and the last column should be F too.

2021 Final

Problem 2. [5 points]

Construct a truth table for the following statement form: $(p \rightarrow q) \vee ((q \oplus r) \rightarrow \sim p)$.

p	q	r	$p \rightarrow q$	$q \text{ xor } r$	$(q \text{ xor } r) \rightarrow \sim p$	$(p \rightarrow q) \vee ((q \text{ xor } r) \rightarrow \sim p)$
t	t	t	t	f	t	t
t	t	f	t	f	t	t
t	f	t	f	t	f	f
t	f	f	f	f	t	t
f	t	t	t		t	t
f	t	f	t		t	t
f	f	t	t		t	t
f	f	f	t		t	t

2021 Final

Problem 3. [5 points]

Verify using truth tables if the following two logical expressions are equivalent.

$(p \rightarrow q) \wedge (\sim p \rightarrow \sim q)$ and $\sim p \leftrightarrow \sim q$

p	q	$p \rightarrow q$	$\sim p \rightarrow \sim q$	$(p \rightarrow q) \wedge (\sim p \rightarrow \sim q)$	$\sim p \leftrightarrow \sim q$
t	t	t	t	t	t
t	f	f	t	f	f
f	t	t	f	f	f
f	f	t	t	t	t

2020 Final-a

Problem 1. [5 points]

Determine if the following deduction rule is valid.

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

$$\sim (p \rightarrow q)$$

$$\therefore r$$

p, q, r	$p \rightarrow (q \vee r)$	$\sim (p \rightarrow q)$	r
t t t	t	f	t
t t f	t	f	f
t f t	t	t	t
t f f	f	t	f
f t t	t	f	t
f t f	t	f	f
f f t	t	f	t
f f f	t	f	f

So, it is valid — the critical row being Row #3 where premises are true and conclusion is true

2020 final-b

Problem 2. [5 points]

Is conditional operator \rightarrow an associative operator? That is, is $(p \rightarrow q) \rightarrow r$ logically equivalent to $p \rightarrow (q \rightarrow r)$? Prove your answer.

p, q, r	$(p \rightarrow q) \rightarrow r$	$p \rightarrow (q \rightarrow r)$
t t t	t	t
t t f	f	f
t f t	t	t
t f f	t	t
f t t	t	t
f t f	f	t
f f t	t	t
f f f	f	t

So, the two are not equivalent, considering the rows with p,q,r being f, t, f or f, f, f

Alternative solution with logical equivalence

Problem 2. [5 points]

Is conditional operator \rightarrow an associative operator? That is, is $(p \rightarrow q) \rightarrow r$ logically equivalent to $p \rightarrow (q \rightarrow r)$? Prove your answer.

- $(p \rightarrow q) \rightarrow r = (\sim p \vee q) \rightarrow r = \sim(\sim p \vee q) \vee r = (p \wedge \sim q) \vee r$
- $p \rightarrow (q \rightarrow r) = \sim p \vee (q \rightarrow r) = \sim p \vee (\sim q \vee r) = (\sim p \vee \sim q) \vee r$
- To show the two differ, consider $r = \text{false}$, $\sim q = \text{false}$, $p = \text{false}$

2020-final-b

Problem 3. [5 points]

Verify using truth tables if the following two logical expressions are equivalent.

$\sim p \leftrightarrow \sim q$ and $\sim (p \oplus q)$

p	q	$\sim p \leftrightarrow \sim q$	$\sim (p \text{ xor } q)$
t	t	t	t
t	f	f	f
f	t	f	f
f	f	t	t

Thus, the two are equivalent.

Summary

- Check validity and equivalence using truth tables

Thank you for your attention!