Honor Code

The Honor Code for CS204 Students

Students enrolled at the KAIST CS204 course are expected to respect personal honor and the rights of others, and they must possess personal integrity and honesty. The students will neither give nor receive any unauthorized aid in class work that is to be graded by the instructor. The following acts are regarded as violations of academic integrity and honesty.

- Referring from other students'/publisher's solutions, assignments, and reports.
- Allowing another student to refer from one's own work
- Submitting another student's work as his or her own
- Unpermitted collaboration or aid on take-home examinations and class assignments
- Plagiarism: the use of another person's original work without giving reasonable and appropriate credit to or acknowledging the author or source

The professor will determine whether any violation has occurred and the appropriate penalty for the violation.

"I have read and agree to abide by all of the above rules and policies, and pledge that I will neither give nor receive any unauthorized aid on examinations or other class assignments that are used by the instructor as the basis for grading."

Student's Name: ______________________________ (Signature)

Date : ______________________________

(This Honor Code format was originally generated for CS320 instructed by Prof. Sukyoung Ryu.)

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Total 10 pts

CS204

Fall 2018, Homework #1

Problem 1. *10 pts*

Given that $P_n(A) = \{X | X \in P(A), |X| \leq n\}$, where $|X|$ is the cardinality of the set X,

a) Prove that $P_n(A) \cup P_m(A) = P_{max(n,m)}(A)$;

b) Prove that $P_n(A) \cap P_m(A) = P_{min(n,m)}(A)$.

Problem 2. *10 pts*

Recall the definition of the image $f(A) = \{f(A) | x \in A\}$ covered in the lecture.

a) Given that E is a set of all even natural numbers and $f(x) = \frac{x}{2}$, prove that $f(E) = \mathbb{N}$.

b) Given that

$$f(n) = \begin{cases} \frac{n}{2}, & \text{n is even} \\ -\frac{n+1}{2}, & \text{n is odd} \end{cases}$$

prove that $f(\mathbb{N}) = \mathbb{Z}$.

Problem 3. *10 pts*

Given that $E = \{1, 2, ..., n\}$ and $f(A, B) = \frac{|A|}{|B|}$,

a) Prove that for all subsets A of E, $0 \leq f(A, E) \leq 1$

b) Prove that f(E, E) = 1.

c) For mutually exclusive subsets A, B of E, show that $f(A \cup B, E) = f(A, E) + f(B, E)$ (Two sets are mutually exclusive when their intersection is empty set.)

Recall axioms of probability you have learned in high school. You might find those familiar.