

1. Determine and print domain D, predicate P of the following expression then write the statement in formal form:

- (a) For all fishes, they need water to survive.
- (b) Exist a person, who is left handed
- (c) Exist an employee in the company, who is late to work everyday.
- (d) For all fishes in this pond, they are Koi fish.
- (e) There is at least one creature in the ocean, it can live on land
- (f) Every students in class A did not pass the test

Example: "For all students, they need to attend classes and do homework."

The answer is:

D is "students"

P is "need to attend classes and do homework"

Formal form: For all x in D, $P(x)$

The answer can be obtain with the following code:

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print("D is 'students'")
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print("P is 'need to attend classes and do homework'")
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print("Formal form: For all  $x$  in D,  $P(x)$ ")
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2. Determine and print domain D, predicate P and Q of the following expression then write the statement in formal form.

For example: with (a) D is "people", P is "is blond", Q is "is westerner". Formal statement: for all x in D, $P(x)$ then $Q(x)$. You can print them like in Exercise 1.

- (a) For all people, if they are blond then they are westerners.
- (b) For all students, if they study correctly then they have high score.
- (c) For every mammal, if they live in the sea, they are either dolphins or whales.
- (d) For every bird, if they don't have wings and can swim then they are penguins.

3. Print Negation, Contra-positive, Converse, Inverse of the following statements:

- (a) If we turn of the water in the shower, then the water will stop pouring.
- (b) If a triangle has three congruent sides, it is an equilateral triangle.
- (c) If you take yoga, then you are relaxed.
- (d) All kids like ice cream.
- (e) If you do your homework, then you can watch TV.

Statement	If p , then q .
Converse	If q , then p .
Inverse	If not p , then not q .
Contrapositive	If not q , then not p .