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CS 225 Section 400, Su 2017

Assignment 1 – Due 7/2/2017

Part III. Exercise Set 3.1 [18]; Exercise Set 3.2 [2, 4]

Exercise Set 3.1

18. Q: Let *D* be the set of all students at your school, and let *M(s)* be "s is a math major," let *C(s)* be "s is a computer science student," and let *E(x)* be "s is an engineering student." Express each of the following statements using quantifiers, variables, and the predicates *M(s), C(s),* and *E(s).*

A: See highlighted sections.

a) There is an engineering student who is a math major.
$\exists s \in D$ such that $\mathrm{E}(s) \wedge \mathrm{M}(s)$
b) Every computer science student is an engineering student.
$\forall s \in D, C(s) \rightarrow \mathrm{E}(s)$
c) No computer science students are engineering students.
$\forall s \in D, C(s) \rightarrow \sim \mathrm{E}(s)$
d) Some computer science students are also math majors.
$\exists s \in D$ such that $\mathrm{C}(s) \wedge \mathrm{M}(s)$
e) Some computer science students are engineering students and some are not.
$(\exists s \in D$ such that $\mathrm{C}(s) \wedge \mathrm{E}(s)) \wedge (\exists s \in D$ such that $\mathrm{C}(s) \wedge \sim \mathrm{E}(s))$

Exercise Set 3.2

2. Q: Which of the following is a negation for "All dogs are loyal"? More than one answer may be correct.

A: See highlighted sections.

a) All dogs are disloyal.
b) No dogs are loyal.
c) Some dogs are disloyal.
d) Some dogs are loyal.
e) There is a disloyal animal that is not a dog.
f) There is a dog that is disloyal.
g) No animals that are not dogs are loyal.
h) Some animals that are not dogs are loyal.

4.Q: Write an informal negation for each of the following statements. Be careful to avoid negations that are ambiguous.

A: See highlighted sections.

a) All dogs are friendly.
Some dogs are unfriendly.

b) All people are happy.
Some people are unhappy.

c) Some suspicions were substantiated.
No suspicions were substantiated.

d) Some estimates are accurate.
No estimates are accurate.