1050 Quiz **QL03**, Jan 17, 2006. NAME:_____. Grade:_____ (____/10)
Closed books. Individual test. Do not look at other people's work. Please write legibly.

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1) Let P(x) be the statement "will fail this class". Where the universe of discourse consists of all students in class. Express ∀x, ¬P(x) in English (1.3-5)

"No student will fail this class"

2) Let P(x) denote "x is my friend". Let Q(x) denote "x is perfect". Translate "Not everyone of my friends is perfect" into a logical expression using quantifiers and connectives.

$\exists x\, P(x) \wedge \neg Q(x)$, or equivalently $\neg(\forall x\, P(x) \rightarrow Q(x))$

3) Mark how the following Processing program should be modified so that it can be used to verify whether ∀i∃!j : (i≠j) ∧ (T[i])=T[j]) where the domain is [1,6].

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int n=6;
int T[] = new int [n];
T[0]=10; T[1]=12; T[2]=10; T[3]=12; T[4]=10; T[5]=12;
boolean trueValue=true;
for (int i=0; i<n; i++) {
    int foundMatch= 0;
    for (int j=0; j<n; j++) {
        if ((i!=j)&&(T[i]==T[j])) {foundMatch++ ;};
        };
    if (foundMatch != 1 ) {trueValue=false;};
    };
println("truevalue="+trueValue);
```

4) M(x,y) means "x has called y". T(x,y) means "x has emailed y ". Use quantifiers to express:
"There are at least two students who, between them have e-mailed or called everyone else in the class. " (13n)

$\exists x \exists y\, (x \neq y \wedge \forall z\, ((z \neq x) \wedge (z \neq y)) \rightarrow (T(x,z) \vee T(y,z) \vee M(x,z) \vee M(y,z)))$

5) Consider the following argument
Premise1: If you did all the assigned exercises you will get an A in the class
Premise 2: You got an A in the class
Conclusion: You did all the assigned exercises
Is it valid? __ *No* ___. If not, what is such an argument called?_____ *Fallacy* _____
Explain why it is not valid (assuming that P stands for "you did the assigned exercises" and Q stands for "you got an A"?__ *The argument* $((P \rightarrow Q) \wedge Q) \rightarrow P$ *is not a tautology. Assume that P is false and Q is true. Then,* $(P \rightarrow Q)$ *is true, but P is false. Hence* $((P \rightarrow Q) \wedge Q) \rightarrow P$ *is false.* _____