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CS 2102 - DMT1 - SPRING 2020 — LUTHER TYCHONIEVICH  
IN-CLASS QUIZ FRIDAY JANUARY 24, 2020

# QUIZ 01

## PROBLEM GROUP 1 *English* $\mapsto$ *Math*

Rewrite each of the following English sentences as an expression over propositions. Include both a mapping from symbols to propositions and the final expression.

1. I'll do well on this quiz if my preparation was good.

*W*: I'll do well

*P*: I prepped well

$P \rightarrow W$

2. Superheroes fight for goodness and look good in tights.

*F*: Superheroes fight for goodness

*T*: Superheroes look good in tights

$(F \wedge T)$

3. If you're a performer or on the staff then you can come in early or on-time.

*P*: You're a performer

*S*: You're on the staff

*E*: You can come in early

*O*: You can come in on-time

$(P \vee S) \rightarrow (E \oplus O)$

4. If you're a midget or a giant (I've never met a giant), you're unusually sized and clothes-shopping is difficult

*M*: You're a midget

*G*: You're a giant

*I*: I met a giant

*U*: You're unusually sized

*S*: Shopping is easy

$((M \oplus G) \rightarrow (U \wedge \neg S)) \wedge \neg I$

PROBLEM GROUP 2 *If Statements*

Write an expression for when the following function returns the given return values. Use the parameters of the function as your propositions. Each function is shown in both Java and Python.

```
def f(a,b):
    if a and (not b):
        return "one"
    elif (not a) or b:
        return "two"
    else:
        return "three"

public static String f(boolean a, boolean b){
    if(a && (!b))
        return "one";
    else if((!a) || b)
        return "two";
    else
        return "three";
}
```

5. f returns "one" when  $a \wedge \neg b$  \_\_\_\_\_

6. f returns "two" when  $\neg a \vee b$  \_\_\_\_\_

7. f returns "three" when  $\perp$  \_\_\_\_\_

PROBLEM GROUP 3 *Truth Tables*

Fill in the following truth table

A	B	C	$(A \leftrightarrow C)$	$\oplus$	$(B \rightarrow C)$
0	0	0	1	0	1
0	0	1	0	1	1
-----					
0	1	0	1	1	0
0	1	1	0	1	1
8.	-----				
1	0	0	0	1	1
1	0	1	1	0	1
-----					
1	1	0	0	0	0
1	1	1	1	0	1