Name SOLUTIONS

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6.818 Fall 2020 Miniquiz #8 5 Minutes

1. Given a frame `σ = { x : 3, y : 7}`, evaluate and provide a derivation for the following expression using the basic inference rules for IMP:

$$\frac{\dfrac{\sigma(x) = 3}{(\sigma, x) \to 3} \quad \dfrac{\sigma(y) = 7}{(\sigma, y) \to 7} \quad 3 + 7 = 10}{(\sigma, x + y) \to 10}$$

2. Suppose we want to add a new type of statement to IMP, `x <-> y`, that swaps the values of the variables `x` and `y`. For example, the following program prints 2 and then 1 to the command line:

```
x = 1; y = 2; x <-> y; print(x); print(y);
```

Write the inference rule for the statement `x <-> y`:

$$\frac{\sigma(x) = n_x \quad \sigma(y) = n_y \quad \sigma[x : n_y][y : n_x] = \sigma'}{(\sigma, x \leftrightarrow y) \to \sigma'}$$