COMPSCI/SFWRENG 2FA3

**Discrete Mathematics with Applications II**

**Winter 2020**

# Extra Credit Assignment 2

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Extra Credit Assignment 2 consists of one problem. You must write your solution to the problem using LaTeX.

Please submit Extra Credit Assignment 2 as two files, `EC_Assignment_2_YourMacID`.tex and `EC_Assignment_2_YourMacID`.pdf, to the Extra Credit Assignment 2 folder on Avenue under Assessments/Assignments. *YourMacID* must be your personal MacID (written without capitalization). The `EC_Assignment_2_YourMacID`.tex file is a copy of the LaTeX source file for this assignment (`EC_Assignment_2.tex` found on Avenue under Contents/Assignments) with your solution entered after the problem. The `EC_Assignment_2_YourMacID`.pdf is the PDF output produced by executing

```
pdflatex EC_Assignment_2_YourMacID
```

This assignment is due **Sunday, February 16, 2020 before midnight.** You are allow to submit the assignment multiple times, but only the last submission will be marked. **Late submissions and files that are not named exactly as specified above will not be accepted!** It is suggested that you submit your preliminary `EC_Assignment_2_YourMacID`.tex and `EC_Assignment_2_YourMacID`.pdf files well before the deadline so that your mark is not zero if, e.g., your computer fails at 11:50 PM on February 16.

**Although you are allowed to receive help from the instructional staff and other students, your submission must be your own work. Copying will be treated as academic dishonesty! If any of the ideas used in your submission were obtained from other students or sources outside of the lectures and tutorials, you must acknowledge where or from whom these ideas were obtained.**

## Background

A set $S$ is *countably infinite* if there is a bijective function from $S$ to $\mathbb{N}$. $S$ is *countable* if it is finite or countably infinite.

## Extra Credit Problem [2 bonus points]

Let $\Sigma = (\mathcal{B}, \mathcal{C}, \mathcal{F}, \mathcal{P}, \tau)$ be a signature of MSFOL. Assume that $\mathcal{V}$ is countably infinite and $\mathcal{B}$, $\mathcal{C}$, $\mathcal{F}$, and $\mathcal{P}$ are countable. Show that $F_\Sigma$, the set of $\Sigma$-formulas, is countably infinite. Hint: Use Gödel numbering to assign a unique natural number to each formula in $F_\Sigma$.

**Put your name, MacID, and date here.**

**Put your solution here.**