Intermediate Math Circles

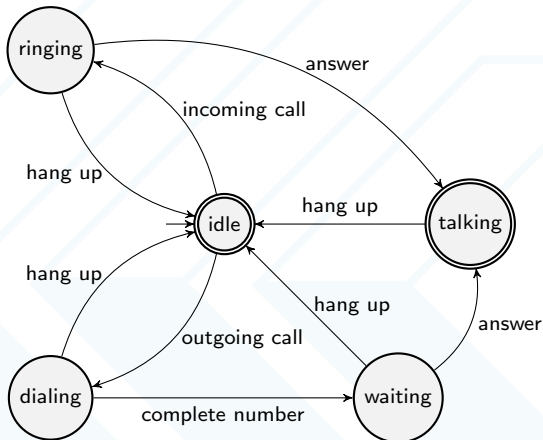## February 24, 2021

STATE MACHINES - EXTRA

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Extra Problem #1

What device could this state machine be modelling?

Extra Problem #2

A popular game involves a character named Mario who turns into different variations of himself (Small, Super, Fire, and Cape) depending on objects in his environment (enemies, mushrooms, flowers, and feathers). The rules of the game are given below:

- The game begins with Small Mario.

- Finding a mushroom turns Small Mario into Super Mario. Mushrooms have no effect on the other variations.

- Finding a fire flower turns all variations into Fire Mario.

- Finding a cape feather turns all variations into Cape Mario.

- A strike from an enemy kills Small Mario. An enemy strike reduces all other variations to Small Mario.

- The desired outcome is to stay alive.

Can you create a state machine to model this game?