

Agent-Based Modeling in Philosophy:

Programming Exercises 3

Exercise 1: Reporters

1. **Triangular Numbers:** A positive whole number k is called *triangular* if there is some whole number n such that $k = \frac{n(n+1)}{2}$. Write a reporter that takes a number k as input and outputs true if k is a triangular number, and false otherwise. Create an input in the interface that allows the user to input k .
2. **Dummy Checking:** Suppose you work for a company that does not allow employees to enter spaces in their passwords. Write a reporter that takes a string as input and outputs true if the string contains no spaces and false otherwise. Create an input in the interface that allows the user to enter a string.
3. **Factor List:** Write a reporter called `factorlist` that takes a number k as input and outputs all of the factors of k . For example, if $k = 12$, then the output of your program ought to be the list [1 2 3 4 6 12].
4. **Perfect Numbers:** If n is a factor of k , then n is called *proper* if it is equal to k . For example, 2 is a proper factor of 12, but 12 is not a proper factor of itself. A positive whole number k is called *perfect* if the sum of its proper factors. For example, 6 is perfect because $6 = 3 + 2 + 1$, and 28 is perfect because $28 = 14 + 7 + 4 + 2 + 1$. Use the reporter `factorlist` to write another reporter called `isperfect?` which returns true if its input is perfect, and false otherwise.