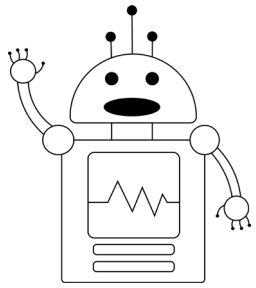
Date: _____ Name: _____

Flood Predictor

This activity was created by Habiba.

We are going to build a program to help predict the likelihood of a flood, based on the probabilities of conditions that lead to floods. These conditions vary from year to year, but let's imagine that on average they have the probabilities indicated below.



PROBABILITIES

EVENT	
Broken dams	5%
Melting snow and ice	20%
Overflowing rivers	5%
Hurricanes and strong winds	2%
Heavy snow pack	20%
Quick thaw	10%
Heavy rain in spring	10%
Lack of vegetation to take up water	3%
Frozen ground preventing absorption	10%
Agricultural drainage systems	5%
Urbanization	10%

The probability of events A **and** B means the probability of two independent events both happening. Mathematically this looks like:
p(A and B) = p(A) x p(B)

The probability of events A **or** B means the probability of one event happening, but not the other. Mathematically, this looks like:
p(A or B) = p(A) + p(B)

Now fill in the blanks in the following program to determine the probability that different flood-inducing factors will occur. The more flood-inducing factors that occur at once, the higher the probability of a flood - but what IS the probability of many flood-inducing factors occurring at once?

```
probabilityOfFloodFactors = 0
predictFactors = input ("what are the factors you want to predict for?")

# fill in the following blanks

if predictFactors == "heavy rain in spring"
     probabilityOfFloodFactors =
else if predictFactors ==  "broken dams" and  "melting snow and ice"
     probabilityOfFloodFactors =
else if predictFactors ==  "broken dams" or  "melting snow and ice"
     probabilityOfFloodFactors =
```

Try out more combinations of flood-inducing events! What is the probability of all of them occurring at once? What is the probability of at least one of them occurring? Where you live, which flood-inducing factors do you think have a higher probability?

SLO: Science: 8-4-01, 8-4-12, 8-4-13, Math: 8.N.3., 8.N.5., 8.SP.2.