**Topics:** Selection (cont'd), MATLAB built-in functions, introduction to iteration
**Reading** (ML): Sec 3,3, 3.4.1–3.4.3, 4.1

## Selection

**Example:** Bacteria B reproduces only when the temperature is above 12°C. The rate is a function of the temperature $t$ in °C: $(t-12)^2$ per hour. *When the temperature drops below 0° C, the bacteria die at a rate of 10 per hour.* Calculate the rate at which bacteria B increases given some temperature entered in °F.

```
% Convert temperature from F to C
  tempF = input('Enter temperature in degrees F: ');
  tempC = (tempF-32)*5/9;

% Calculate rate
  tRep = 12;  % Temperature above which bacteria reproduce




  if (tempC>tRep)
     rate = (tempC-tRep)^2;




  else
     rate = 0;
  end
```

# MATLAB Built-in Functions... Fun with MATLAB

MATLAB provides numerous built-in variables and functions. Below is a collection of commands that can be typed in the command window to illustrate some of the built-in features:

```
% This is a comment

% Variables, constants, and simple calculations:
  a = 100
  b = 99
  format compact
  a/b
  ans
  y = ans
  format long
  y
  format short
  y
  (3*2)^2
  (3*2)^2;
  x = 2;  y = x^x;  z = y^y
  format loose

% Functions:
  sqrt(x)
  pi  % a built-in variable
  cos(pi)
  abs(ans)
  abs(cos(pi))
  exp(ans)
  rand(1)
  mod(5,2)
  help mod
  lookfor mod
```

# Iteration

How do I get from the front of the classroom to the back?

Important features:

- Task can be accomplished if some step is repeated a number of times
- Must be able to quantify success ⇒ _____
- Must have a starting point
- Must keep track of progress ⇒ _____