Writing in progress

Basic programming

1. `for` and `while`
2. `if .. else` and `if .. else if .. else`
3. `continue` and `break`

Computing integrals

1. Numeric integration: `integral`, `integral2`, `integral 3`
2. Symbolic integration: `syms` and `int`

Exercise

1. Let us write a function which computes the integral $\iint_D f dA$ for rectangular domain $D = [a, b] \times [c, d]$
   (a) First, let us compute the integral line-by-line. Use the example of $f(x, y) = x^2 + y^2$ and $D = [0, 1] \times [0, 1]$.
   (b) Find the `meshgrid` of D by partitioning each side to 100 subdivisions.
   (c) Using `for` twice, compute the sum $f(x_i, y_i)\delta x_i \delta y_i$ where x_i, y_i is the smallest value in the i-th subdivision of each interval and $\delta x_i, \delta y_i$ is the length of i-th subdivision.
   (d) Check your result with `integral2(@(x,y)x^2+y^2,0,1,0,1)`.
2. Next, we compute $\iint_D f dA$ for the domain given by

$$D = \{a \leq x \leq b,\ g_1(x) \leq y \leq g_2(x)\}$$