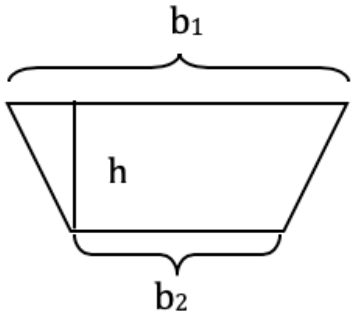
Lab 02: Designing functions

Create a separate file for each question. Keep them in your "Labs" folder, with the name `lijqk` for Lab `ij`, question `k`. See **Helpful tips** for information on creating and naming files. Download the headers for each function from the file `labinterface02.rkt` You can obtain feedback on your work (except warm-up exercises) by submitting it to MarkUs and requesting a public test. The same process is used to perform basic checks on your assignment work.

Language level: Beginning Student

1. *Class exercise with lab instructor assistance*

Consider a trapezoid with parallel bases of lengths b1 and b2, and height h:



Its area is given by the formula [(b1+b2)/2]*h. Create the function *trapezoid-area* that consumes three positive numbers *(b1, b2* and *h*), and produces the area of the corresponding trapezoid.

2. *Warm-up exercise* [Adapted from HtDP exercise 2.4.2]

Type each of the following definitions, one by one, into the *Definitions* window and click Run. Read the error messages and fix the errors.

(**define** (*f* 1) (+ *x* 10))

(**define** (*g x*) + *x* 10)

(**define** *h*(*x*) (+ *x* 10))

3. *Warm-up exercise* [Adapted from HtDP exercise 2.4.4]

Enter the following Racket program into the *Definitions* window and click Run:

(**define** (*somef x*)

(*sin x x*))

Then, in the *Interactions* window, evaluate the expressions (*somef* 10 20) and (*somef* 10).

Read the error messages and note what DrRacket highlights.

4. Create a function *onehalf* that consumes a positive integer (*nbr*) and produces the closest integer less than or equal to nbr divided by 2. That is, (onehalf 16) and (onehalf 17) will both produce 8. Hint: use *quotient*.
5. Create the function *middle-digit* that consumes an integer (called *nnn*) between 100 and 999, inclusive, and produces the middle digit of *nnn*. For example, *(middle-digit 345)* produces *4*, and *(middle-digit 803)* produces *0*. Hint: use *quotient* and *remainder*.
6. Create the function *set-middle-to-zero* that consumes an integer (called *nnn*) between 100 and 999, inclusive, and produces a number like *nnn*, except that the middle digit has been set to 0. For example, *(set-middle-to-zero 345)* produces 305 and *(set-middle-to-zero 104)* produces 104. You may wish to use the function *middle-digit* that you just created

Helpful tips

Opening a new file

Under "File" on the menu bar, select "New" (or "New Tab", if you wish to add tabs to a current window).

Opening an existing file

Under "File" on the menu bar, select "Open...". This will bring up a window that lets you select a file to open.

Saving a file

Press the "Save" button on the window. If this is a new file, you will see a window that lets you choose a name for your file and a directory to put it in.

Managing files (general advice)

You might wish to organize your account so that you have folders for labs, assignments, teachpacks, and other downloads from the course Web site.