

CMPU 101 § 55 · Computer Science I · Spring 2019  
Assignment 1

**Due February 13, 9:00 a.m.**

- As we've done in lab, make a new directory for your asmt: `mkdir asmt01`
- Write your solutions to these problems in the Definitions Window in DrRacket.
- Download `asmt-helper.scm` from the class website and include it by adding the expression `(load "asmt-helper.scm")` at the beginning of your definitions file.

*Problem 1*

Translate each of the following expressions into Scheme. Evaluate each of your expressions using `tester` to verify your expression is correct.

- $1 + 2$
- $3 - (2 + 1)$
- $2 \times 5$
- $2 \times (2 + 3)$

*Problem 2*

Write Scheme expressions that build each of the following lists using only quoted symbols, the empty list, and the `cons` function. Use `tester` to print the result of your expressions.

- `(a b c)`
- `((a) (b))`
- `((1))`
- `(() () ())`

*Problem 3*

Write a function called `make-question` that operates on a three-element list. It returns a rearrangement of the input list in which the first element becomes the second, the second becomes the first, and the list ends with a question mark. Use only the procedures `first`, `rest`, and `cons`. Examples:

```
(make-question '(i am sam))    ⇒ (am i sam ?)
(make-question '(you are here)) ⇒ (are you here ?)
```

*Problem 4*

Write a predicate `between?` that takes three numbers as inputs and returns `#t` if the first is both greater than the second and smaller than the third, i.e., for inputs  $x$ ,  $y$ , and  $z$ ,  $x$  is between  $y$  and  $z$ ;  $y < x < z$ . Examples:

```
(between? 5 2 9) ⇒ #t
(between? 1 2 9) ⇒ #f
(between? 2 2 9) ⇒ #f
```

Note: You don't need to – and shouldn't – use `if` or `cond` to write this predicate.

*Problem 5*

Write a procedure called `greeting` that takes three arguments: an integer representing the hour, an integer representing the minute, and a symbol that is either `am` or `pm`. The procedure should return one of four greetings, depending on the time of day:

<i>Time range</i>	<i>Greeting</i>
6:00 a.m. to 11:59 a.m.	'(good morning)
12:00 p.m. to 5:59 p.m.	'(good afternoon)
6:00 p.m. to 11:59 p.m.	'(good evening)
12:00 a.m. to 5:59 a.m.	'(working late?)

Examples:

```
(greeting 10 42 'am) ⇒ (good morning)
(greeting 5 14 'pm) ⇒ (good afternoon)
(greeting 11 59 'pm) ⇒ (good evening)
(greeting 2 2 'am) ⇒ (working late?)
```

For this procedure, you *will* need to use `if` or `cond`!

*Submitting*

When you are done, save your definitions file, run your code, and save the interactions file as plain text. Then submit them electronically:

```
submit101 g-asmt01 asmt01
```

(where `g-asmt01` is the dropbox you're submitting your work to and `asmt01` is the name of the directory you've saved your work in; change it if you used a different name).