CSE 305 Programming Languages Spring, 2010
Homework 3
Maximum Points: 33
Due 10:30 AM, Friday, February 5, 2010

Professor Shapiro

January 29, 2010

Write the answers in a file named `hw3.txt`. Put your name and user name at the top of the file, and submit the file, using the UNIX command, `submit_cse305 hw3.txt`.

1. (4)
   (a) (3)What are the keywords of Ruby?
   (b) (1) What is your source for that information?
2. (12)Write the answers to Problem 6 on page 241 of the Sebesta text. Your answer for each of the 6 subquestions should be "Main's X", "Sub1's X", "Sub2's X", or "Sub3's X".
   (a) Assuming static scoping:
      i. (2) Sub1:
      ii. (2) Sub2:
      iii. (2) Sub3:
   (b) Assuming dynamic scoping:
      i. (2) Sub1:
      ii. (2) Sub2:
      iii. (2) Sub3:
3. (8)Write the answers to Problem 10 on page 243 of the Sebesta text.
   (a) (2) Visible variables at point 1:
   (b) (2) Visible variables at point 2:
   (c) (2) Visible variables at point 3:
   (d) (2) Visible variables at point 4:

4. (3) Assume that `f1` and `f2` in the following Ruby program each use *m* bytes of stack memory for its local storage. What is the maximum amount of total stack memory ever used by `f1` and `f2` during the run of the program?

```
def f1(n)
  puts "In f1(#{n})."
  if n == 0
    return
  elsif n == 1
    f2(3)
  end
  f1(n-1)
end

def f2(m)
  puts "In f2(#{m})."
end

f1(2)
```

5. (6)

   (a) Type the following Erlang program into a file named `test.erl`:

```
-module(test).
-export([capital/1]).

capital(State) ->
  case State of
    NY -> Albany;
    CT -> Hartford;
    CA -> Sacramento
  end.
```

   (b) In the same directory as the program, enter the Unix command `erl`.

   (c) The Erlang shell will start. To the Erlang shell prompt enter `c(test).` (Include the period.) You should get an error message.

   (d) (3) Correct your Erlang program, and enter it here in your answer file. (Hint: See the lecture notes at `http://www.cse.buffalo.edu/~shapiro/Courses/CSE305/Notes/names.html`.)

   (e) Back in the Erlang shell, again enter `c(test).` This time it should compile and load correctly.

   (f) Test your program by entering to the Erlang shell prompt `test:capital(____).` (Again, include the period, and replace the blank with a valid symbol.)

   (g) Exit the Erlang shell by entering the command `halt().` (With the period.)

   (h) (3) Enter the transcript of your entire Erlang shell interaction here: