CMSC 330 Ruby and Ruby Regular Expressions Fall 2012

1. Programming languages

   a. Explain how goals for programming languages have changed since the 1960s.

   b. List two desirable attributes for a programming language where Ruby is better than C. Explain why.

   c. Give two methods for executing a program. Which method is used by Ruby?

2. Ruby basics

   a. Write a Ruby method `printit` that takes an integer as a parameter, and prints it. Write a call to `printit` with 2 as its argument. Circle and label the formal and actual parameters in your code.

   b. Using different Ruby control statements, write four different code fragments that each iterate and print the values between 1 and 10.

   c. Explain the difference between explicit and implicit variable declarations.

   d. Give two advantages of static types.

   e. Write a Ruby class `Teacher` that contains an integer field `students` and an integer field named `totalStudents` that is shared across all objects of the class. You don't have to write any methods for the class.

   f. Give an example of shallow (reference) copy in Ruby.

   g. Give an example of testing for structural equality in Ruby.

3. Ruby advanced features

   a. Describe the strings accepted by the Ruby regular expression `/3{2}/`.

   b. Describe the strings accepted by the Ruby regular expression `/[A-Z]/`.

   c. Describe the strings accepted by the Ruby regular expression `/[A-Z]*[0-9]/`.

   d. Describe the strings accepted by the Ruby regular expression `/0$/`.

   e. Describe the strings accepted by the Ruby regular expression `/\./`.

   f. What is the output of the following Ruby program?

```
a = [4, 5, 6]
a[5] = 7
a.delete_at(1)
puts a
a.push(2)
a.push(1)
puts(a.pop)
```

g. What is the output of the following Ruby program?

```
a = ["c", "b", "a"]
puts(a)
b = a
a.sort!()
puts(b)
```

h. What is the output of the following Ruby program?

```
a = {4 => 6, 5 => 7}
puts(a[4])
puts(a[6])
puts(a.values())
```

i. What is the output of the following Ruby program?

```
if ("CMSC 330" =~ /1/) then
  puts("t")
elsif ("CMSC 330" !~ /1/) then
  puts("f")
else
  puts("n")
end
```

j. What is returned by `file = File.new("filename", "r"); lines = file.readlines();`?

k. What is returned by `x = ARGV[0]`?

l. Write a Ruby method named `m` that takes a code block (one that does not have any parameters) and executes it twice.

4. Write a Ruby program that reads the name of a text file from the command line, opens the file, reads every line of text in the file, and prints only the lines that contain exclusively the following characters: uppercase and lowercase letters, digits, and underscore. For example, lines that contain any spaces or punctuation should not be printed.