

CMSC 330, Practice Problems 1

1. Programming languages
 - a. Explain how goals for programming languages have changed since the 1960's.
 - b. List 2 desirable attributes for a programming language where Ruby is better than C. Explain why.
 - c. List 2 methods for executing a program. Which method is used by Ruby?
2. Ruby basics
 - a. Write a Ruby method foo that takes an integer as a parameter. Call foo with 2 as its argument. Circle & label the formal and actual parameters in your code.
 - b. Using different Ruby control statements, write 4 code fragments that iterate from i=1 to i=10.
 - c. Explain the difference between explicit and implicit variable declarations.
 - d. List two advantages of static types.
 - e. Using Ruby, write a class Teacher that contains an integer field students and an integer field totalStudents that is shared across all objects of class Teacher.
 - 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?

```
“CMSC 330” =~ /[0-9]+/
puts $1
puts $2
```
 - g. 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
```
 - h. 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
```

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

```
a = ["c", "b", "a"]
puts a
b = a
a.sort!
puts b
```
- j. What is the output of the following Ruby program?

```
a = CMSC 330 CMSC 351"
b = a.scan(/[A-Z]+/)
puts b
a.scan(/[0-9]+ [A-Z]+/) { |x| puts x }
```
- k. What is the output of the following Ruby program?

```
a = {4 => 6, 5 => 7}
puts a[4]
puts a[6]
puts a.values
```
- l. What is the output of the following Ruby program?

```
h = Hash.new(0)
h["a"] = h["b"]
h["b"] = 7
h["c"] += 2
puts "#{h["a"]} #{h["b"]} #{h["c"]}"
```
- m. What is returned by “file = File.new(filename, "r"); lines = file.readlines();”?
- n. What is returned by “x = ARGV[0];”?
- o. Write a Ruby function foo that takes a code block and executes it twice.

4. Ruby programming

- a. Write a Ruby program that reads in lines of input from \$stdin and remembers all integers (consecutive digits) encountered. Each line of input may contain 0 or more integers or non-integers. The program should stop and print out the list of integers in sorted order (from smallest to largest) when the word “Done!” is encountered.
- b. 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 space or punctuation should not be printed.