Introduction to Scientific Programming
Final Exam
Dr. Jennifer Kay
December 15, 2008

Name: _____

Last 4 digits of your Rowan ID: _____

On my honor I promise that I will not discuss the contents of this exam with anyone other than those seated in this room until after 5pm on Friday December 19, 2007. I also affirm that I have no prior knowledge of the contents of this exam.

Signature: _____

Problem	Points	Score
1	20	
2	20	
3	20	
4	20	
5	20	

This exam is closed book. You may NOT use a computer or calculator. You MAY use a single piece of paper that you have brought with you to the exam.

Problem 1: Questions from the on-line Quizzes

(10 questions, 2 points each)

For each of these questions, **circle the correct answer**

a) **To cause a program to display "Visual Basic" inside label lblLanguage, use the command**

- `lblLanguage.Forecolor = "Visual Basic"`
- `lblLanguage.Print "Visual Basic"`
- `lblLanguage.Text = "Visual Basic"`
- `lblLanguage.Caption = "Visual Basic"`
- `lblLanguage.Name = "Visual Basic"`

b) **To cause a program to erase the contents of picture box picMessage, use the command**

- `picMessage.Caption = ""`
- `picMessage.Text = ""`
- `picMessage.Forecolor = ""`
- `picMessage.Cls`
- `picMessage.Print ""`
- `picMessage.Name = ""`

c) **What will this code print?**

```
x = 3
y = 4
z = 5
picOutput.Print "x", "y", "z"
```

- x 4 z
- 3 y 5
- 3 y z
- x y 5
- 3 4 z
- x 4 5
- x y z
- 3 4 5

d) **What will this code print?**

```
x = 30
y = 5
x = x - y
y = y * 2
x = x + 1
picOutput.Print x, y
```

- 30 5 25 10 31
- 5
- 30
- 31 10
- 30 5
- 26 10
- 30 5 2 1

e) **If function *f* is defined this way:**

```
Private Function f(x As String, y As String) As Integer
  f = Len(x) + Len(y)
End Function
```

what will be printed by the command `picOut.Print f("New", "Jersey")`

- 3
- 10
- 6
- JerseyNew
- NewJersey
- 9
- NJ

f) **If function *f* is defined this way:**

```
Private Function f(x As Integer, y As Integer) As Integer
  f = 2 * (x + y)
End Function
```

what will be printed by the command `picOut.Print f(4, 10)`

- 24
- 14
- 10 4
- 18
- 4 10
- 28

g) **What will this code print?**

```
x = 5
y = x + 1
z = x + 2
If x < y And y < z Then
   picOutput.Print "x"
ElseIf z < x Or y < x Then
   picOutput.Print "y"
Else
   picOutput.Print "z"
End If
```

- y
- z
- x
- x y z
- 6
- 7
- 5
- 5 6 7

h) **The expression** `x < 10 And x > 10` **is**

- True if x is smaller than 10 or equal to 10, and false if x is bigger than 10.
- Always true, no matter what x's value is.
- Always false, no matter what x's value is.
- True if x = 10, and false otherwise.
- True if x is bigger than 10 or equal to 10, and false if x is smaller than 10.

i) **What will this code print?**

```
X = 9
Do While X >= 5
   picOutput.Print X,
   X = X - 1
Loop
```

- 8 7 6 5 4
- 8 7 6 5
- 9 8 7 6 5 4
- 9 8 7 6 5
- 9 8 7 6

j) **What will this code print?**

```
First = 5
Last = 8
For x = First To Last
   picOutput.Print x,
Next x
```

- 5
- 1 2 3 4 5 6 7 8
- 26
- 5 6 7 8
- 13
- 8

Problem 2 (20 points)

Write code that takes two integers as arguments, called low and high (you can read them off a form, or write a sub that takes them as arguments)

If low is less than high, then you should print out all the numbers between low and high inclusive on one line. For example, if low is 6 and high is 14, you should print `6 7 8 9 10 11 12 13 14`. If low is not less than high, you should print “error, low is not less than high”

Problem 3: (2 parts, 10 points each)

a) Write a function that takes one argument: a string with a letter grade and returns the numeric equivalent according to the following chart

Grade	Numeric
A	4.0
B	3.0
C	2.0
D	1.0
F	0.0

Problem 3 is Continued on next page ….

(Problem 3 continued)

b) Write another function that takes one argument that is a string that represents a letter grade with an optional plus or minus. So the argument could be one of the following:

```
"A", "A-", "B+", "B", "B-", "C+", "C", "C-","D+", "D", "D-","F"
```

Convert the grade to its numeric equivalent. A plus adds 0.3 and a minus subtracts 0.3 from the score on the chart on the previous page.

HINT: To figure out if there is a + or a – in your string, figure out the length of your string. Then call the function that you wrote in part A to get the number for the letter, and finally, add or subtract 0.3 if appropriate.

Problem 4: 20 points

a) (4 points) Write a line of code that declares an integer array that can hold exactly 1500 numbers.

b) (6 points) Suppose that the 1500 spaces in your array were initialized somewhere by your program (so now each space has a number in it). Write a piece of code that adds up the numbers in the first 4 spaces in your array and prints the total (i.e. you're printing the sum of the first 4 numbers in your array).

c) (10 points) Write a loop that adds up all of the 1500 numbers in your array and prints the result.

Problem 5 (2 parts, 10 points each):

a) Write a function called countAZ that takes a 4-letter-long string as an argument and returns the number of times there is a letter A or a letter Z in that string. Make sure you count both upper and lower case. You may assume that the string has EXACTLY 4 letters in it.

Example 1: `countAZ("AzaZ")` would return 4
Example 2: `countAZ("Ozob")` would return 1
Example 3: `countAZ("coin")` would return 0

Problem 5 is continued on the next page …

Problem 5 (continued)

b) Suppose that txtOne and txtTwo are text boxes that each have a string in them that is 4 letters long. Write code (pretend you're already in a click event) that uses the function in part a to decide whether the two words have the same total of A's and Z's in them, and print a message with the answer.

- Note 1: the letters do not have to be the same, there just has to be the same number of them. So "AZbo" and "haha" would be the same.
- Note 2: even if your function in part a doesn't work, you can get full credit on this part as long as you call the function the way you should.