CSC2111

Computer Science I

Lab 19

50 points

Due 04/09/16 10:00 pm

You should put comments in your take-home assignments. Solutions without comments will be deducted 5 points in grade.

Do Chapter 15 Programming Exercises 11 & 12. (25 points each)

11. Write a recursive function, `power`, that takes as parameters two integers x and y such that x is nonzero and returns x^y. You can use the following recursive definition to calculate x^y. If $y \geq 0$:

$$power(x, y) = \begin{cases} 1 & \text{if } y = 0 \\ x & \text{if } y = 1 \\ x \times power(x, y-1) & \text{if } y > 1. \end{cases}$$

If $y < 0$:

$$power(x, y) = \frac{1}{power(x, -y)}.$$

Also, write a program to test your function.

12. **(Greatest Common Divisor)** Given two integers x and y, the following recursive definition determines the greatest common divisor of x and y, written $\gcd(x, y)$:

$$gcd(x, y) = \begin{cases} x & \text{if } y = 0 \\ gcd(y, x\,\%y) & \text{if } y \neq 0 \end{cases}$$

Note: In this definition, % is the mod operator.

Write a recursive function, `gcd`, that takes as parameters two integers and returns the greatest common divisor of the numbers. Also, write a program to test your function.

Grading Ruberic

- *(15 points)* for each recursive function.
- *(10 points)* for each test program (or, if you only make one program, each test portion thereof).