1 Instructions

1. The homework assignment is to turned in by 11:00 am. in class on February 1.

2. Each question is worth 3 points.

3. Attempt as many problems as you can. You will be given partial credit, as per the policy discussed in class.

2 Problems

1. Write a function in SCHEME for computing the number of digits of a positive integer. You may assume the existence of the successor() function, which returns $(x + 1)$, when called with $x$.

2. Write a fragment in PROLOG that returns $2^x$, when called with $x$.

3. As discussed in class, the C language permits only call-by-value as a parameter-passing mechanism. How then can the value of a variable be changed permanently within a function?

4. Discuss how the following features have been promoted and violated in the C programming language: (a) Expressiveness, (b) Uniformity.

5. Assume that you are given a rudimentary programming language which contains only four operators, viz., +, −, abs and div. + and − have their usual meanings, while $div(a, b)$ returns the quotient of $\frac{a}{b}$ and $abs(a)$ returns the absolute value of $a$. Write a C-style function $max(a, b)$ that takes two integers $a$ and $b$ as input and returns the maximum of the two. Note that you can only use the operators provided; in particular, the constructs "if", "while", and "for" are not available.