CS 2 Computer Science II-Numerical Methods Semester II 2004/05
http://www.isibang.ac.in/athreya/cs205 **Hw 2**

Due: Thursday January 20th, 2005
Problems to be turned in 2(b), 4, 5

1. Evaluate the following by hand and check your results in MATLAB

   (a) 5|4
   (b) ˜3
   (c) Given x = [0 5 3 7] and y = [0 2 8 7], u = x((x¿y) & (x¿4)).
   (d) A = `reshape`(1:8,2,4); B = A (5*ones(2,2))

2. `newsqrt`

   (a) Write a `newsqrt` function to compute the square root of a positive number, using Newton's Algorithm, one discussed in class using `while.. end`. An upper limit on the number of iterations and an acceptable error value should be include in the input arguments. Allow for default values if the user decided not to give any or one of the input parameters. (`Do not use any input prompt command.`)
   (b) Write a `newsqrt` function to compute the square root of a positive number, using Newton's Algorithm, one discussed in class but this time using `for.. end`.

3. Write the MATLAB statements that use a loop and the `fprintf` function to produce the following table(the format of the numerical values should agree exactly with those printed in the table):

`theta`	`sin(theta)`	`cos(theta)`
0	0.0000	1.0000
60	0.8660	0.5000
120	0.8660	-0.5000
180	-0.0000	-1.0000

4. `myage`

   (a) Write down a function `myage`, that returns your age in years.
   (b) Extend the above `myage` function with an optional input argument, `onDate`, can be provided for testing. This modified `myage` function should return your age in years on `onDate`, where `onDate` is a MATLAB date number. (see help datenum). Your program should correctly compute your age on the following test dates:
      i. When you first encountered Siva: January, 3 2005.
      ii. One day before your first birthday.
      iii. On the day the assignment is due: January, 20, 2005.

      Hint: you may use built-in datevec function
   (c) Extend the `myage` function developed so far in the preeceding problem to provide an optional return of the months and days since you were born. For example: Suppose you were born on April, 1, 1904. The function should yield the following values:
```
> > y = myage(datenum(2004,7,11))
y =
        100
>> [y,m] = myage(datenum(2004,7,11))
y =
        100
```

```
m =
        3
>> [y,m,d] = myage(datenum(2004,7,11))
y =
        100
m =
        3
d =
        10
```

5. Spot the bug in the function `bugbreak(n)` below and fix it without dismantling the `break` command:

```
function bugbreak(n)
x = rand(1,n)
k =1 ; while k <= n
   if x(k) > 0.7
       break
    end
    k = k +1
end
fprintf('x(k) = % f for k = % d n = % d \ n', x(k), k, n);
```

6. Write down a function `polyd` that evaluates the first derivative of a polynomial of arbitrary degree at a given point x. Use the Horner's rule (i.e. the method discussed in class) and `for ..end`. The function should take in the vector c of coefficients and x a real number where the derivative should be evaluated.