# NUMERICAL ANALYSIS
# PROGRAM SET A

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Abstract. Create the following programs using Visual C++. Send the .CPP files to `plbailey@saumag.edu`, as an email attachment, for the following programs: Program 3, Program 5, Program 6.

Due by Friday, September 19, 2003.

**Program 1.** Create a program to find and print the first n primes.
Syntax: `primes n`
where `primes` is the name of the program, and `n` is the number of primes to produce. The program should default `n` to 100 if it is not entered, and it should force `n` into the range 0 through 10000.

**Program 2.** Create a program to find and print the greatest common divisor of two integers.
Syntax: `gcd m n`
where `gcd` is the name of the program, `m` is one integer, and `n` is the other integer.

**Program 3.** Modify Program 2 to find and print the expression of the greatest common divisor as a linear combination of the two integers.
Syntax: `euc m n`
where `euc` is the name of the program, `m` is one integer, and `n` is the other integer. The output should be of the form `d = xm + yn` .

**Program 4.** Create a program to convert integers from one base to another.
Syntax: `base x m n`
where `base` is the name of the program, `x` is the integer, `m` is the source base, and `n` is the target base. Note that `m` and `n` are positive integers which are greater that or equal to 2 and less than or equal to 62.

**Program 5.** Modify Program 4 to handle rational input in radix form.
Syntax: `basf x.y m n`
where `basf` is the name of the program, `x` is the integer part of the input, `y` is the less than one part of the input, `m` is the source base, and `n` is the target base. The program should handle exceptional cases intelligently.

**Program 6.** Create a program to compute the sine of a real number.
Syntax: `sin x`
where `sin` is the name of the program, and `x` is converted into a double precision floating point number. Use the Taylor expansion of sine. Shift `x` into the interval $(-\pi, \pi)$ for faster convergence.

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