On Your Own Topics

1. Create a Board game that uses logic definitions and operations to advance your playing piece.
2. Write a computer program that accepts the numerator and denominator of a fraction, and produces as output the numerator and denominator reduced to lowest terms. Use Euclid’s algorithm and not trial and error to do the reduction.
3. Write a computer program that accepts a user supplied integer, *a* and displays all prime numbers < *a*, using the Sieve of Eratosthenes algorithm.
4. Write a computer program than accepts two 3x3 bit matrices – *A* and *B* – and displays the two matrices, their meet and their join.
5. Download a copy of grep for Windows (check Source Forge). Document, with examples, the use of regular expressions with grep.
6. Write a computer program that accepts a string and a keyword. Use the keyword to encode the string, using keyword columnar transposition.
7. Research the ciphers used during the American Revolutionary War. Write a paper that presents the results of your research. Include specific examples of the ciphers used.
8. Research Huffman encoding. Write a paper that describes, for a specific message from your instructor, how to determine the codes, how to encode the message, and how to decode the encoding.
9. Research Turing machines. Write a paper that describes a Turing machine and its relationship to algorithms.
10. Research Jonniac. Write a paper that describes the computer and its use.