

Ch5Proj1.cpp

Research a non-elementary example (i.e. not factorial, computing powers, etc.) of recursion in C++. Non-elementary examples of recursion are listed below. You must obtain Mr. Minich's approval of your topic before you begin to write your paper to be sure that your example is not elementary or trivial.

Write a program that uses a recursive function. Your program must follow our class Coding Standards and it must include ample documentation so that others can easily learn from the code.

Write a one or two-page paper on your program and its particular use of recursion. Explain the overall efficiency of the recursive algorithm versus the efficiency of an iterative version of the algorithm. Also, make sure that you explain the Big O time efficiency and Big O space efficiency. Mention whether the function is tail-recursive or not. If you use code or ideas from another source (e.g. Web site), cite the author by including Web page URL addresses at the end of your paper.

As another page of your paper, attach a neat hand-drawn or computer-generated run-time trace diagram that illustrates a test case of your program (e.g. Figure 5-10 on p. 331, Figure 5-13 on p. 335, Figure 5-15 on p. 337).

You must also present your program and your paper to the class in an oral presentation.

Non-elementary examples of recursion:

- Selection sort
- Insertion sort
- Quicksort
- Merge sort
- Eight Queens
- generating all the possible permutations of a given set of characters
- greatest common divisor
- Four Color Theorem
- generating e (Euler's constant)

You cannot use Towers of Hanoi, binary search, or N Choose K examples of recursion since they are already illustrated & fully explained in our textbook.