

## Code-a-thon Project Idea - TextFinder

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Here's a problem definition I thought about during our Zoom meeting. It approximates some of the suggestions and is quite different from others. Intended to be a strawman.

1. Goals:
  - a. Clear and simple statement
  - b. Rich enough to provide interest to students from different experience levels
  - c. Easily testable program results
  - d. Can implement in many common programming languages: C, C++, Python, Java, ...
2. Proposed coding problem: Text Finder
  - a. Identify all files in a directory subtree that contain a specified text.
  - b. Specify root path, file pattern(s), and search text on command line
  - c. Display file name and path without duplication of path name, e.g., organized by directory
  - d. Interesting extensions:
    - i. Select files by pattern, e.g., \*.h, \*.cpp
    - ii. Replace text by regular expressions for both search text and file names
3. Required student activities:
  - a. Develop software design (could be a pre-thon event, say 24 hours, with mentor support)
    - i. Identify relevant program tasks:
      1. Parse command line
      2. DFS traversal of directory tree
      3. Open matching files
      4. Search for text
      5. Display results in some meaningful order
    - ii. Develop software structure
      1. Parts (call graph or packages or classes)
      2. Responsibilities of each part
      3. Execution time-line
      4. Potential for forking execution with threads or processes (not implemented)
    - iii. Define error handling
      1. Parsing errors, opening errors, reading errors
    - iv. Define tests
      1. Empty directory
      2. Directory tree with specified files, some matching pattern, some not matching
  - b. Implement TextFinder
    - i. Credit for partial results weighted by experience.
    - ii. Run on directory contents provided by Code-a-thon directors
      1. Contains some folders with binary files
      2. Only one correct result known by Directors
  - c. Present design, relate that to displayed results