Utility Software

- Utility software is a kind of system software designed to help analyze, configure, optimize and maintain the computer.
- A single piece of utility software is usually called a utility or tool.
- Utility software usually focuses on how the computer infrastructure (including the computer hardware, operating system, application software and data storage) operates.
  - Due to this focus, utilities are often rather technical and targeted at people with an advanced level of computer knowledge.

Utility Software

- Some examples
  - Backup software
  - Data compression software
  - File managers
  - Network utilities
  - System monitors
  - System profilers
  - Cryptographic utilities

Programming Software

- A programming tool or software development tool is a program or application that software developers use to create, debug, maintain, or otherwise support other programs and applications.
- The term usually refers to relatively simple programs that can be combined together to accomplish a task, much as one might use multiple hand tools to fix a physical object.

Programming tools

- Assemblers
- Compilers
- Linkers
- Interpreters
- Debuggers
- Editors
- Profilers

Assemblers

- Assemblers create object code by translating assembly instruction mnemonics into machine language.
- Available since 1950s.
- One-pass assembler.
- Two-pass assembler.
- Mostly not directly called by the users.

Compilers

- A computer program or a set of computer programs that transforms source code written in a programming language into object code.
- Many operations
  - Lexical analysis, preprocessing, parsing, semantic analysis, code generation, code optimization
- Cross compiler.
- Decompiler.

Linkers

- A program that takes one or more objects generated by a compiler or assemble and combines them into a single executable program.
- Objects files have symbols
  - Defined symbols
  - Undefined symbols
  - Local symbols

Linkers

- Dynamic Linking -- Undefined symbols are not resolved until a program is run.
  - One copy of a library.
  - Ease of updates.
  - Incompatible library problem.

Interpreters

- An interpreter normally means a computer program that executes, i.e. performs, instructions written in a programming language.
- An interpreter may be a program that either
  - executes the source code directly
  - translates source code into some efficient intermediate representation (code) and immediately executes this
  - explicitly executes stored precompiled code made by a compiler which is part of the interpreter system

Debuggers

- A debugger or debugging tool is a computer program that is used to test and debug other programs (the "target" program).
- When the program "crashes" or reaches a preset condition, the debugger typically shows the position in the original code if it is a source-level debugger or symbolic debugger,
- If it is a low-level debugger or a machine-language debugger it shows the line in the disassembly.

Editors

- A text editor is a type of program used for editing plain text files.
- Text editors are often provided with operating systems or software development packages, and can be used to change configuration files and programming language source code.
- Source code editors have features specifically designed to simplify and speed up input of source code, such as syntax highlighting, autocomplete and bracket matching functionality.

Profilers

- Profiling ("program profiling", "software profiling") is a form of dynamic program analysis that measures, for example, the usage of memory, the usage of particular instructions, or frequency and duration of function calls.
- The most common use of profiling information is to aid program optimization.
- Profiling is achieved by instrumenting either the program source code or its binary executable form using a tool called a profiler (or code profiler).