Systems Programming Lab (CS-244)

Text Editor

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Recap

- System programs – what?
  - To enable us to use the “system”

- How it is different from application programs?
  - Simple – we *write & execute* application programs with the *help* of system programs

Recap

- System programs – what we have covered so far?
  - Assembler (compiler)
  - Loader
  - Linker

- What role do they perform?

- We are now going to learn about text editors (another system program)

Basic Idea

- Why text editor is system program (looks more like an application program, isn’t it)?

- Because, through it, we can provide some input to the system

  - Can’t write any application program without it!

Introduction

- An editor is a tool
  - Enable the user to create and edit *files* (any file)
  - Acts as a primary interface between user and computer
  - Enables the user to do the following on computer-based information
    - Compose
    - Organize
    - Study
    - Manipulate

Types of Editors

- Based on the input, there are following types
  - Text editor (Notepad, Wordpad etc) – **our focus**!
  - Graphics editor (Photoshop, CorelDRAW etc)
  - Sound editor (Audacity)
  - Video editor (Pinnacle Studio, Lightworks etc)

Text Editor

- A tool that allows a user to create and edit *documents* in a computer
- The basic input to the editor is text
- Multiple documents may be handled at once

- Examples
  - Windows OS - Notepad, WordPad, Microsoft Word
  - UNIX OS - vi, emacs, jed, pico

Types of Text Editors

- Based on how editing is performed
  - Line editors
  - Stream editors
  - Screen editors
  - Word processor
  - Structure editors

Line Editors

- Line of the text are recognized by the system for processing
- End-of-line marker is used to end the line
- Line number is specified explicitly
- Line number is used for revision of the document
- Eg. Edlin editor in early MS-DOS system, teco

Not very popular nowadays!

Stream Editors

- Similar to line editor
- Entire text is treated as a single stream of characters
- Location revision can not be specified by line number
- Location for revision is specified by explicit positioning
- Eg. Sed in Unix/Linux

Note: Line and stream editors are suitable for text-only documents

Screen Editors

- Allow the document to be viewed and operated upon as a two dimensional plane
- A portion may be displayed at a time in case the document content is more
- Location for revision can be specified anywhere within the displayed portion
- Eg. vi, emacs, Notepad

Word Processor

- Provides additional features to the basic screen editors
- Usually supports non-textual contents and choices of fonts, style, etc.
- Non-textual content includes image, audio, video, etc.
- It majorly focuses on Natural languages
- Eg. Open office, Microsoft Word, Google Doc, etc.

Structure Editors

- These are editors for specific types of documents
- The editor recognizes the structure/syntax of the document
- Focuses on programming languages
- Provides features to write and edit source code
- Eg. Netbeans IDE, gEdit

Common Text Editing Features

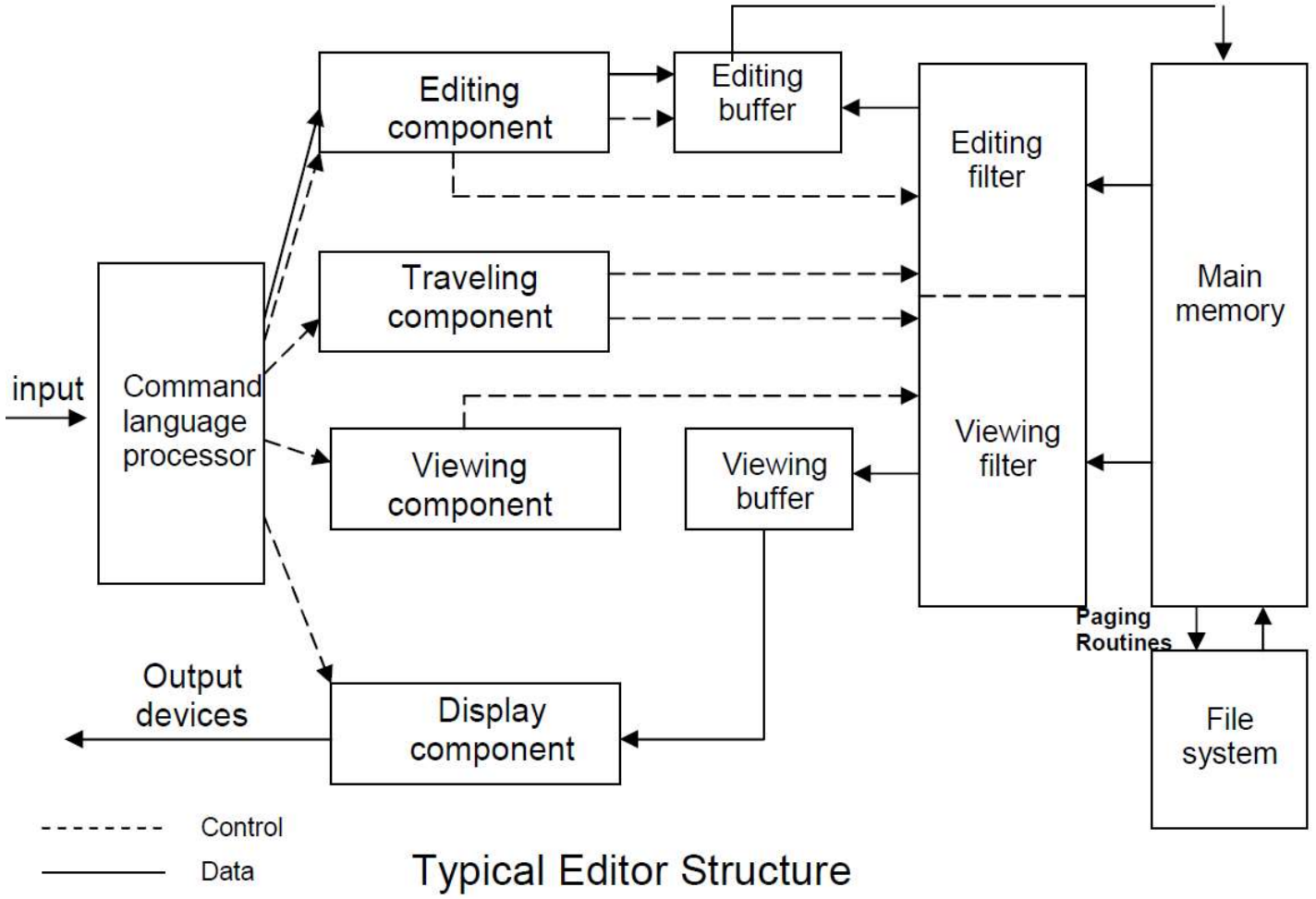
- Moving the cursor
- Deleting
- Replacing
- Pasting
- Searching
- Searching and replacing
- Saving and loading
- Miscellaneous (e.g. quitting)

Document Editing Process

It is an interactive user-computer dialogue having four tasks

1. Select the part of the target document to be viewed and manipulated
2. Determine how to format this view on-line and how to display it
3. Specify and execute operations that modify target document
4. Update the view appropriately

Editor Structure



Typical Editor Structure

Editor Structure (contd.)

- **Command language Processor:** It accepts the input from the user's input device and passes to the following phases
  - **Lexical Analysis:** Analyzes the tokens of the accepted input
  - **Syntax Analysis:** Analyzes the syntactic structure of the commands
  - **Semantic Analysis:** Performs editing, viewing, traveling and displaying by using sematic routine

Editor Structure (contd.)

- **Traveling components:** Performs the setting of current editing and viewing pointers
- **Editing components:** It is the collection of modules dealing with editing task.
- **Editing buffer:** It is piece of memory used for current editing pointers
- **Editing filter:** It filters the documents to generate new editing buffer based on the current editing pointer and parameters

Editor Structure (contd.)

- **Viewing Components:** It is responsible for determining the next view
- **Viewing buffer:** It is piece of memory used for current view pointers
- **Viewing filter:** It filters the documents to generate new viewing buffer based on the current editing pointer and parameters
- **Display component:** It produces a display by mapping the buffer to a rectangular subset of the screen known as the window

Salient Aspects

- A text editor has to cover the following main aspects related to document creation, storage and revision
    - Interactive user interface
    - Appropriate format for storing the document in file in secondary storage
    - Efficient transfer of information between the user interface and the file in secondary storage.

Our Focus

- Latex – a word processing system
- You'll learn about the creation of Latex documents in the subsequent tutorials and lab sessions

Questions?