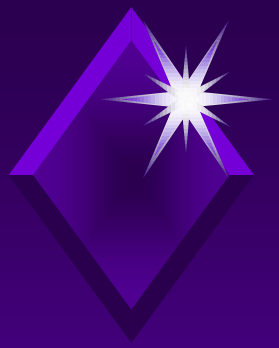
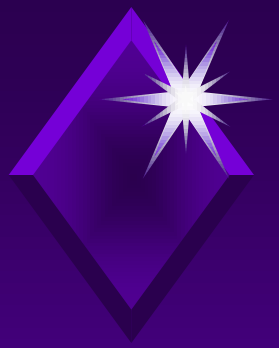
Pipes, Filters and Redirection



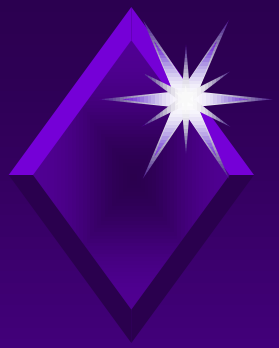
Overview

Will use redirection to redirect standard input and standard output.



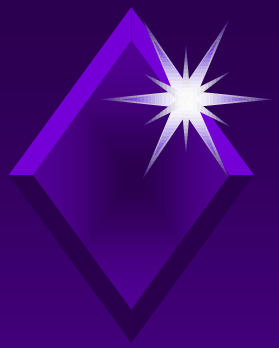
Overview

Learn how pipes can be used to connect programs.



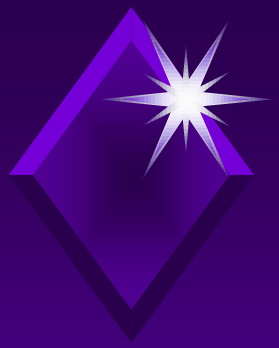
Overview

How filters can be used to manipulate data will be explained.



Overview

What shell extensions are and how they may be used will be discussed.



Overview

Learn how to combine commands using pipes, filters, and redirection.

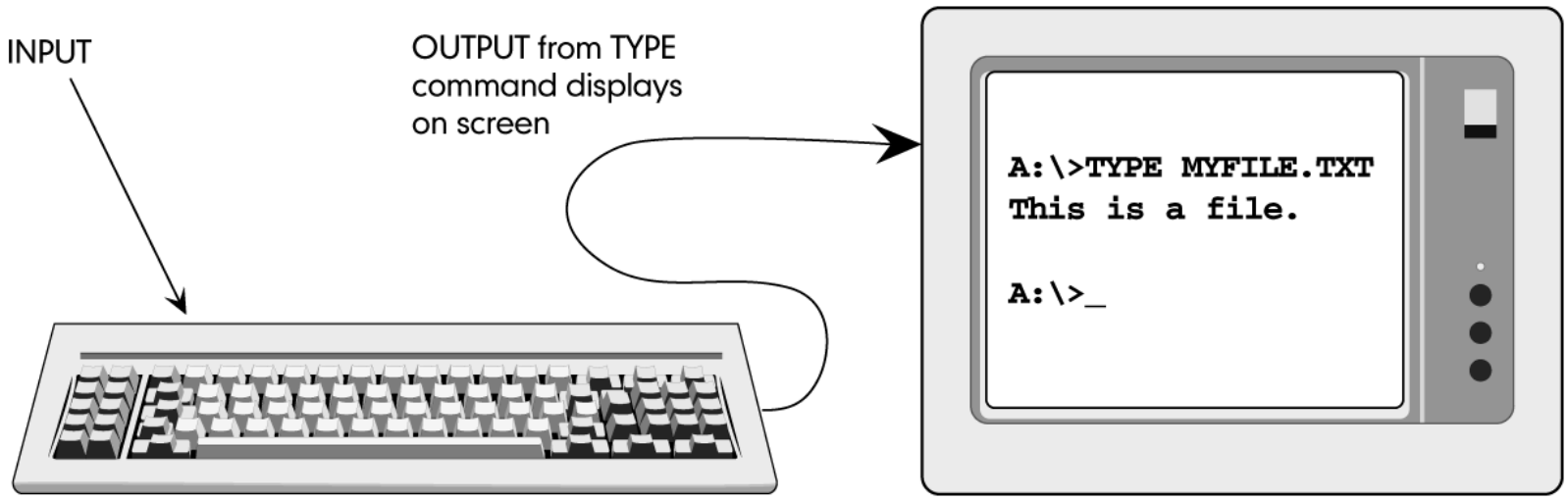
Redirection of Standard I/O (Input/Output)

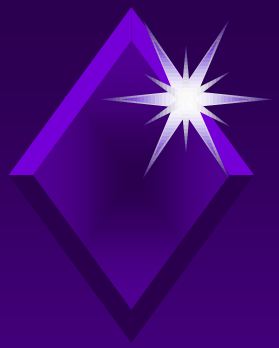
Operating system gets information from or sends information to:

- Standard input
- Standard output
- Standard error

Redirection of Standard I/O (Input/Output)

Fig 9.1 Input and Output Devices p. 440





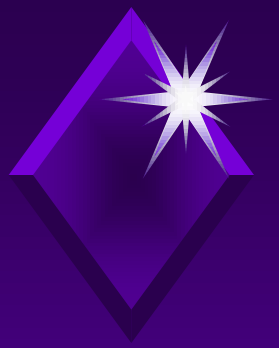
Redirection of Standard I/O (Input/Output)

Not all commands deal with standard input/output.

Redirection of Standard I/O (Input/Output)

Fig 9.2 Results of Copy Command p. 440

```
A:\>COPY MY.TXT ONE.FIL          <-- INPUT from user
        1 file(s) copied         <-- OUTPUT from COPY command
A:\>
```

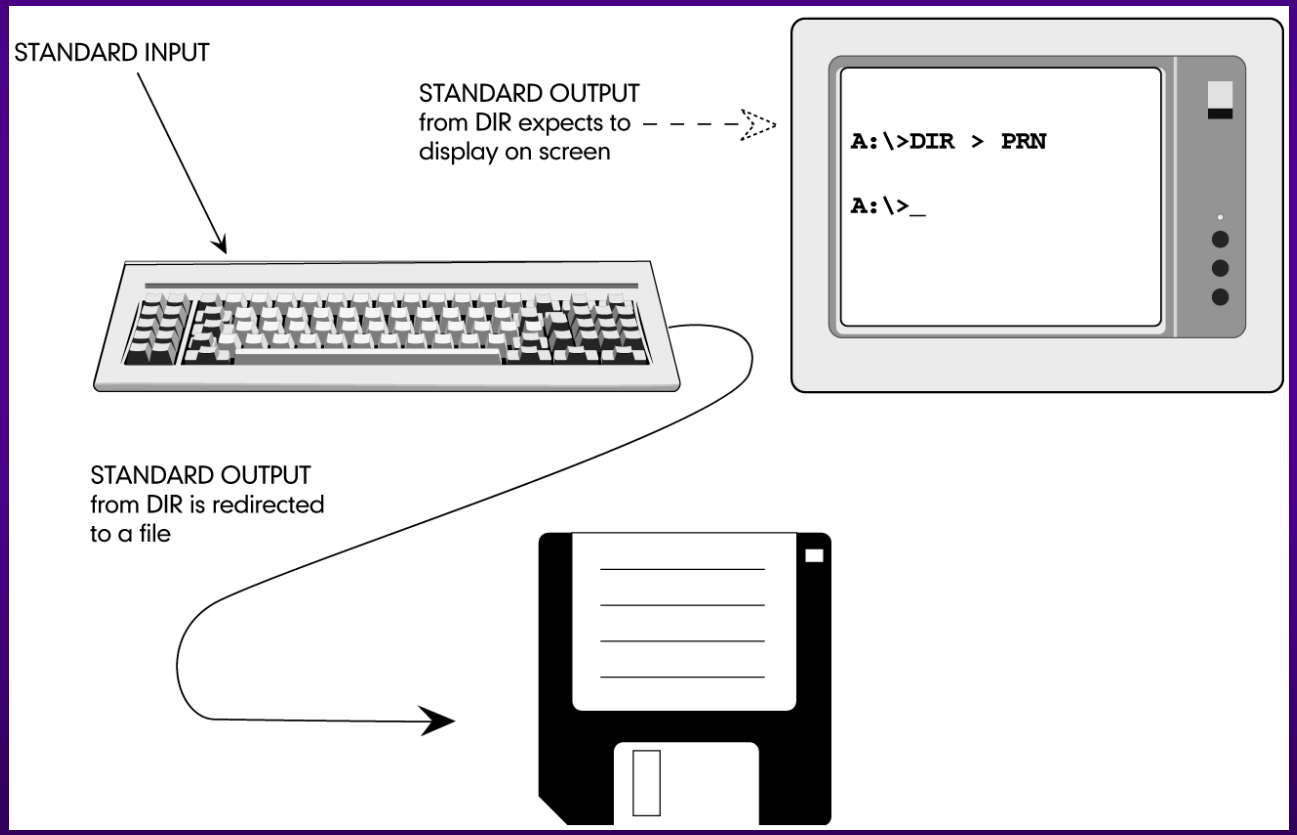


Redirection of Standard I/O (Input/Output)

I/O redirection tells OS you want information read from or written to a device other than the standard ones.

Redirection of Standard I/O (Input/Output)

Fig 9.3 Redirecting Standard Output p. 441



Redirection of Standard I/O (Input/Output)

Symbols used for redirection:

- > (greater than)
- < (less than)
- >> (double greater than)

Activity—Using > to Redirect Standard Output

KEY CONCEPTS:

- Redirection is either/or process
- Redirection works with commands that write their results to standard output device (screen)
- Using >
- COPY can only copy files, not commands

Activity—Using < to Redirect Standard Input

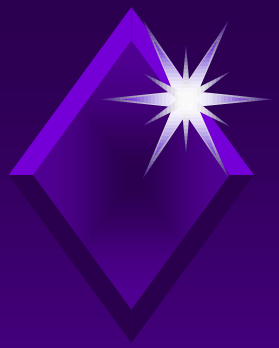
KEY CONCEPTS:

- DEL*.* requires keyboard response
- Using <
- Any input from keyboard ignored if redirection of input is from a file

Activity—Using >> to Add Redirected Output to a File

KEY CONCEPTS:

- Using > between files - first file overwrites second file
- Using >> between files - first file appended to end of second file



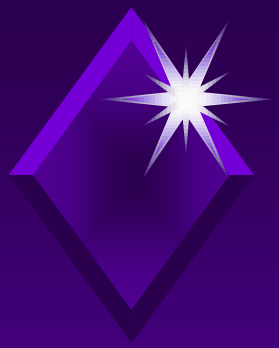
Filters

Filter commands manipulate information.

Filters

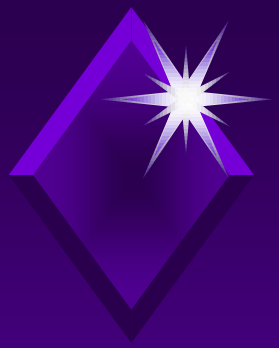
Three filter commands:

- SORT
- FIND
- MORE



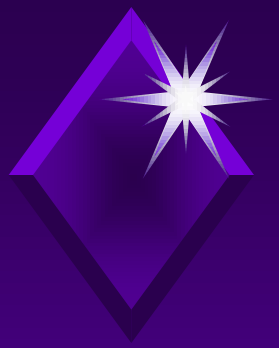
Filters

Operating system creates temporary files while it “filters” data.



Filters

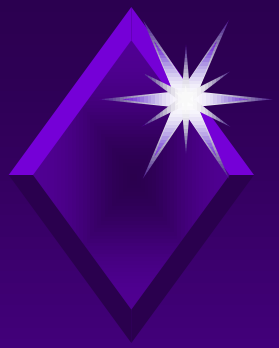
Operating system will not be able to execute filter commands on write-protected disk.



The SORT Command

SORT filter command:

- Arranges lines of input in ascending order
- Sends output to standard output unless redirected



The SORT Command

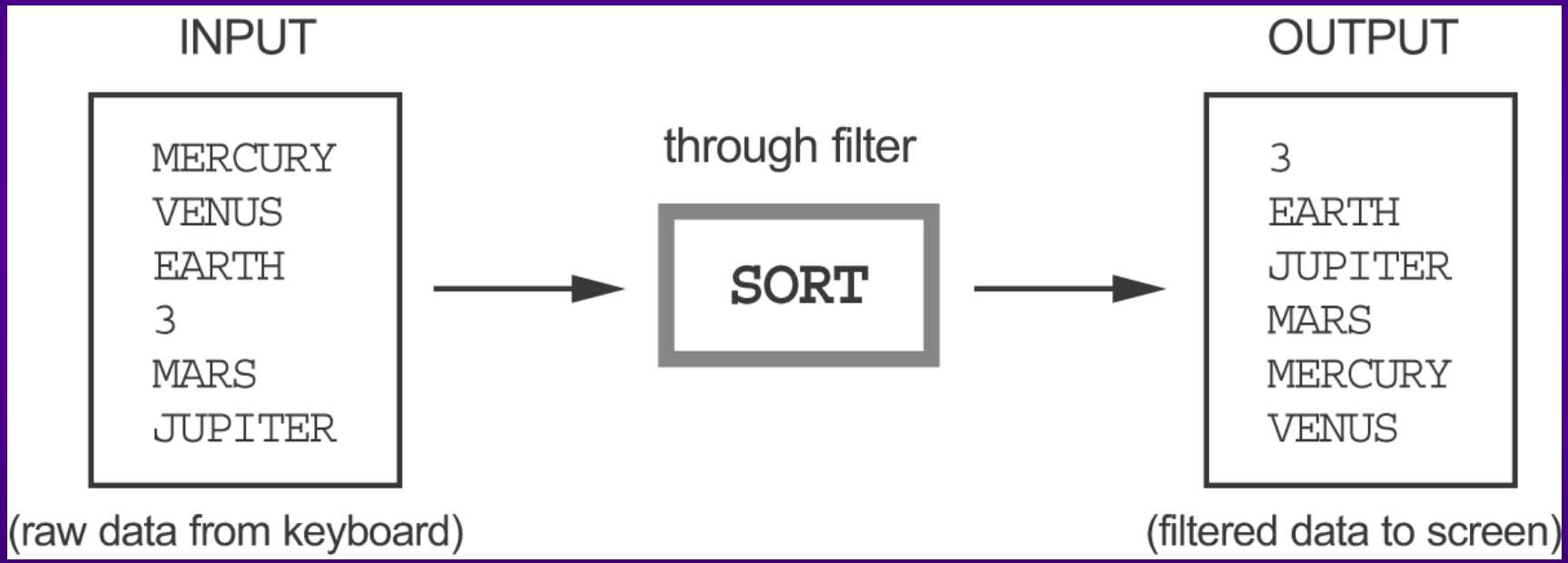
SORT syntax:

SORT [/R] [/+N] [/M kilobytes] [/L locale] [/REC recordbytes] [[drive:] [path1] filename1] [/T [drive2:] [path2]] [O [drive3:] [path3] filename3]

Note: full syntax in Appendix H

Activity—Using SORT

Fig 9.4 Filtering Data p. 448



Activity—Using SORT

KEY CONCEPTS:

- <F6> same as <Ctrl> + Z
- Numbers are numbers only when mathematical operation performed on them
- Numbers often used as character data
- Character data sorted from left to right
- Numeric data sorted by units

Activity—Using SORT

KEY CONCEPTS:

- ASCII sort sequence order:
  - punctuation marks (including spaces)
  - numbers
  - letters (lowercase then uppercase)

Activity—Using SORT

KEY CONCEPTS:

- Sort sequence of BB, aa, #, 123, bb, 13, AA
  - # 123 13 aa AA bb BB
- Sort sequence of "Carolyn Smith and Robert Nesler"
  - Carolyn Smith
  - Robert Nesler

Activity—Using SORT

KEY CONCEPTS:

- Can force OS to sort numbers correctly by using spacebar to add space characters
- Using spaces forces lines to be same length - placing number digits in proper position
- Left justify character data
- Right justify numeric data

Filters and Redirection

- Can redirect both output and input of filter commands.
- Filter commands not usually used with keyboard input.

Activity—Using the SORT Command with Redirection

KEY CONCEPTS:

- /R - sorts in reverse or descending order
- /+n - sorts by column number (character number)
- /O - stores sorted data in a file (faster than redirection)

Activity—Using the SORT Command with Redirection

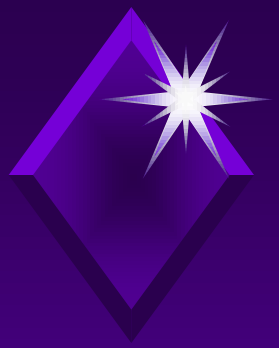
KEY CONCEPTS:

- In Windows XP Professional SORT does not require < prior to file being sorted
- Column - On screen is place occupied by one character
- Column number really means character number
  - + 17 - seventeenth position in list

The FIND Filter

FIND filter command:

- Allows you to search a file for a specific character string by enclosing it in quotation marks.



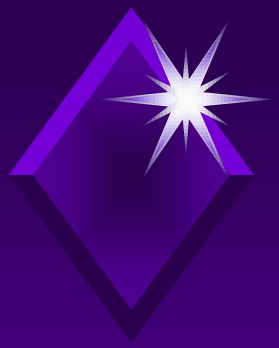
The FIND Filter

FIND syntax:

FIND [/V] [/C] [/N] [/I]

[/OFF[LINE]]“string”

[[drive:] [path] filename[…]]



The FIND Filter

FIND command is looking for exact match, therefore, is case sensitive unless /I parameter is used.

The FIND Filter

FIND command at command line can help find a file based on content.

Activity—Using the FIND Filter

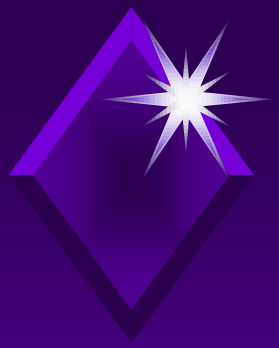
KEY CONCEPTS:

- With FIND must use double quotes
- Character string must be enclosed in quotes
- FIND is case sensitive

Activity—Using the FIND Filter

KEY CONCEPTS:

- FIND parameters:
  - /I - ignores case
  - /V - search a file for anything except what is in quotes
  - /N - finds specific line number of each occurrence
  - /C - numeric count of number of times specific character string appears in a file



Pipes

Pipes:

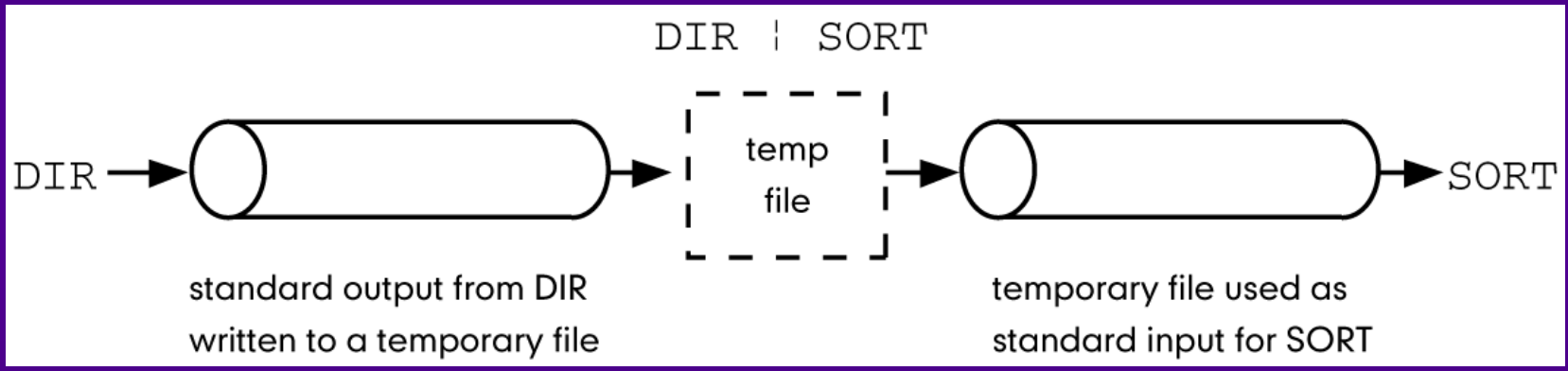
- Standard output of one program used as standard input to next program
- Used with filter commands to further refine data
- Not limited to two programs

Pipes

- Pipe symbol is the vertical broken bar | and is used between two commands.
- Location of the pipe symbol is not standard.

Pipes

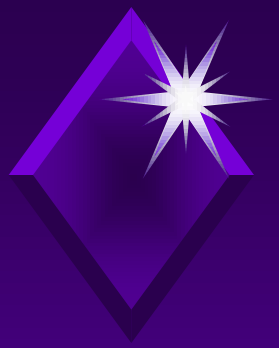
Fig 9.5 Piping Commands p. 457



Pipes

Filter commands:

- External commands
- Read and write temporary files to disk will not work if a disk is write-protected.



Pipes

All files must be named - even temporary ones.

The MORE Filter

MORE filter:

- Useful when reading long text file
- Returns to system prompt when no more data in file
- Can be both redirected and used with a pipe

The MORE Filter

MORE syntax:

MORE [/E [/C] [/P] [/S] [/Tn] [+n]] < [drive:] [path] filename command-name | MORE [/E [/C] [/P] [/S] [Tn] [+n] MORE /E [/C] [/P] [/S] [/Tn] [+n] [files]

The MORE Filter

Extended features:

P n	Display next n lines
S b	Skip next n lines
F	Display next file
Q	Quit
=	Show line number
?	Show help line
<space>	Display next page
<ret>	Display next line

Activity—Using the MORE Filter

KEY CONCEPTS:

- Locate pipe signal
- Continued pressing of <Spacebar> will return to system prompt
- With extended features pressing Q will break command and return to system prompt
- Can connect several commands with pipes and filters

Activity—Using the MORE Filter

KEY CONCEPTS:

- /P works only with DIR command
- /P not a valid TYPE parameter
- Records - lines of information in a data file
- MORE allows you to view file at a specified line or record number
- /C parameter clears the screen before each display

Other Features of MORE

Bottom of the syntax diagram of MORE command: (Shown earlier)

If extended features are enabled, the following commands are accepted at the –MORE– prompt:

P n	Display next n lines
S n	Skip next n lines
F	Display next file
Q	Quit
=	Show line number
?	Show help line
<space>	Display next page
<ret>	Display next line

Other Features of MORE

- Command prompt (default) enables shell extensions.
- CMD /X - enables shell extensions.
- CMD /Y - disables shell extensions.

Other Features of MORE

Shell is the command interpreter used to pass commands to operating system.

Other Features of MORE

- Commands that use shell extensions:

  DEL, COLOR, CD, MD, PROMPT, PUSHD, POPD, SET, SETLOCAL, ENDLOCAL, IF, FOR, CALL, SHIFT, GOTO, STARTS, ASSOC, and FTYPE.

- Command name with /? gives full details as to what can be done with command.

Activity—Using the Extended Features of MORE

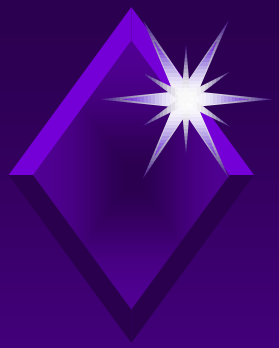
KEY CONCEPTS:

- Run remembers last command keyed in
- /X - ensures ability to use extensions to commands
- With extensions enabled results of keying in <Spacebar> of keying in <Enter>
- Key in /Q - exit MORE command and return to system prompt

Activity—Using the Extended Features of MORE

KEY CONCEPTS:

- Key in /P - stops MORE - can request how many lines you want to display
- = sign - displays which line number you are on
- S - asked how many lines you want to skip in your display



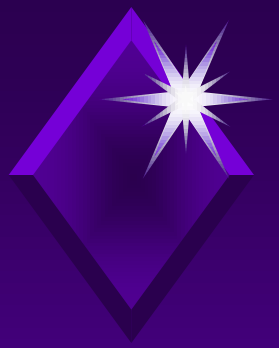
Combining Commands with Pipes and Filters

Use of ***pipe symbol***:

- Join commands (output from one command is input to next command)
- Connect two or more programs and create a flow of data

Combining Commands with Pipes and Filters

- When pipe symbol is used, there must be a command on both sides of the actual symbol.
- If redirection used with “pipeline”, command does not have to be on either side of > or >>.



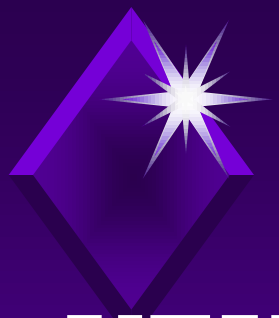
Combining Commands with Pipes and Filters

- Redirecting output from a command is an “instead of” process.
- Redirection becomes end of pipeline when you combine use of pipes and >.

Activity—Combining Commands

KEY CONCEPTS:

- Can search data to display only those lines/records that meet your requirements
- If command sends output to screen can redirect output
- Pipes
  - Must have command on either side of pipe
  - Taking standard output of command and using it as standard input to next command



Activity—Combining Commands

KEY CONCEPTS:

- Redirection
  - An "instead of" action
  - Only get one output place
  - Output goes to last place it is directed to go
- Primary use of pipes and filters is to manipulate standard output/input of commands
- Pipes/filters rarely used to sort or find data in text or data files