

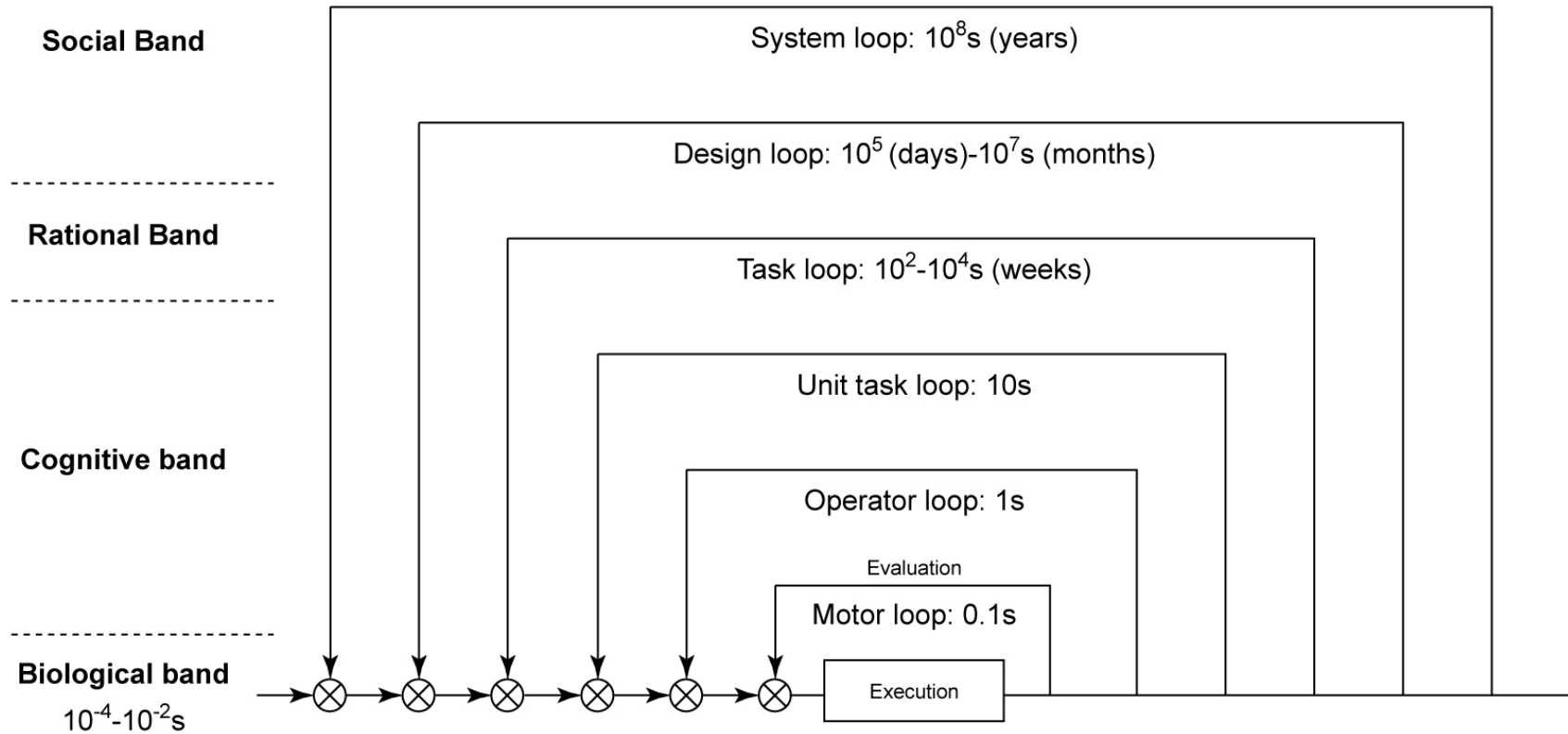
Questions?

- Project #2
- HW #3 in
- HW #4 out
- Flash tutorial this Friday

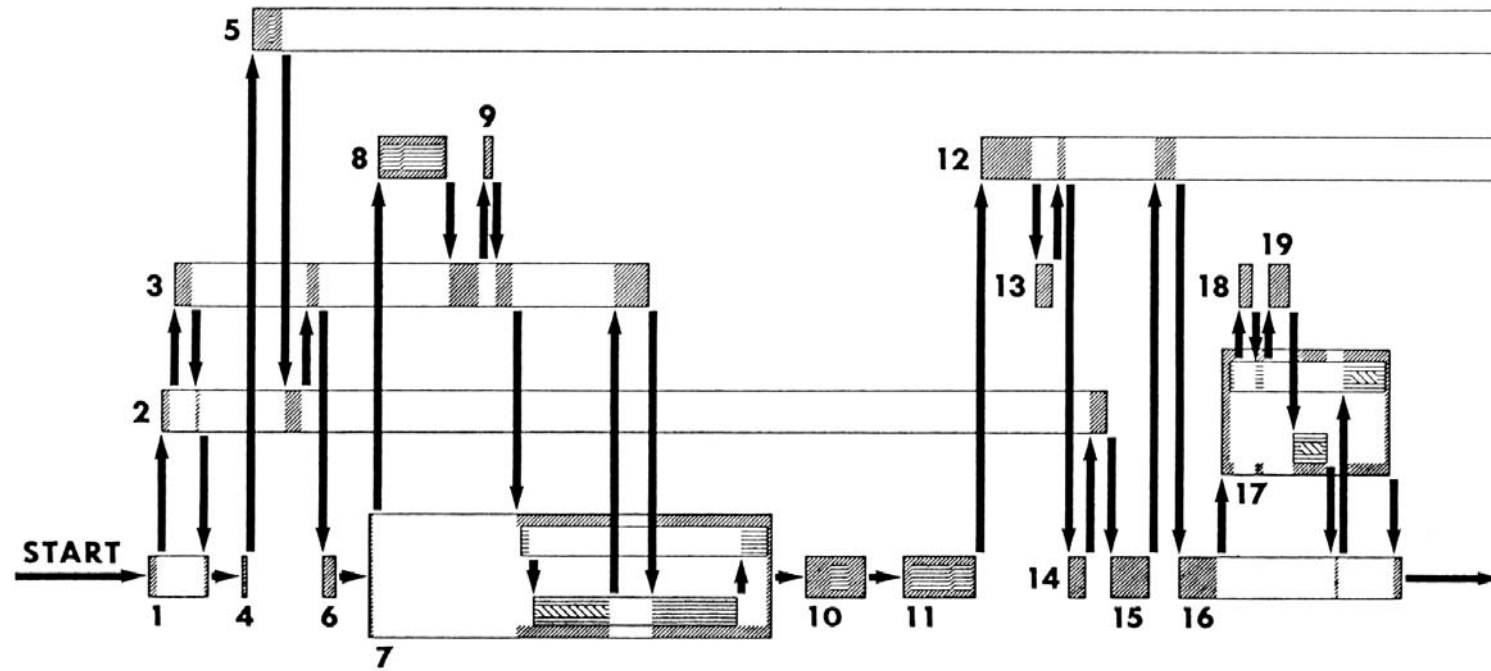
Survey

- Printing
- Workload
 - Reading
 - Homework
 - *Vague*
 - *Timely feedback*
- Class participation
- Comments
 - All slides are online
 - Use office hours if you have questions
 - New study session (see web page)
 - Midterm and final

Human interaction loops (Newell)



Task structure

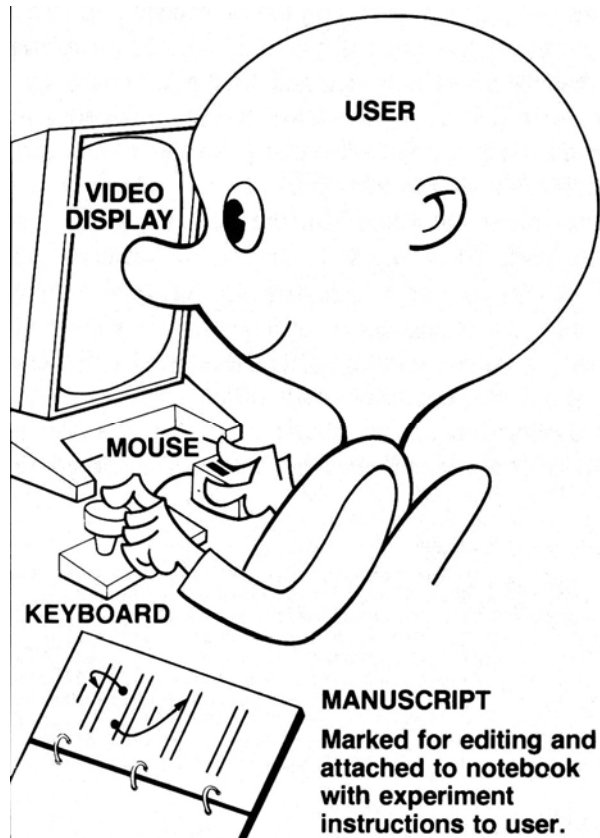


GOMS (Card et al.)

- Family of methods
 - KLM, CMN-GOMS, NGOMSL, CPM-GOMS
- Describe the user behavior in term of
 - Goals
 - *Edit manuscript, locate line*
 - Operators
 - *Elementary perceptual, motor or cognitive acts*
 - Methods
 - *Procedure for accomplishing goals*
 - Selection rules
 - *Used if several methods are available for a given goal*

GOMS example I

- Setting



- Analysis

GOAL: EDIT-MANUSCRIPT

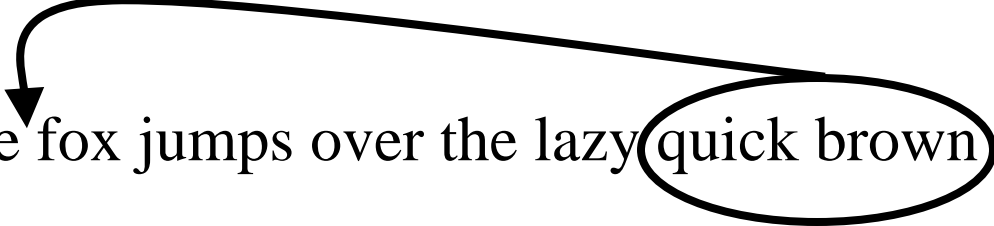
- . **GOAL: EDIT-UNIT-TASK** *repeat until no more unit tasks*
- . . **GOAL: ACQUIRE-UNIT-TASK**
- . . . **GET-NEXT-PAGE** *if at end of manuscript page*
- . . . **GET-NEXT-TASK**
- . . **GOAL: EXECUTE-UNIT-TASK**
- . . . **GOAL: LOCATE-LINE**
- [select: **USE-QS-METHOD**
USE-LF-METHOD]
- . . . **GOAL: MODIFY-TEXT**
- [select: **USE-S-COMMAND**
USE-M-COMMAND]
- **VERIFY-EDIT .**

GOMS example II

(From HCI Models, Theories and Frameworks, J. Carroll)

- Using a text editor edit the following text as shown

The fox jumps over the lazy(quick brown)dog.



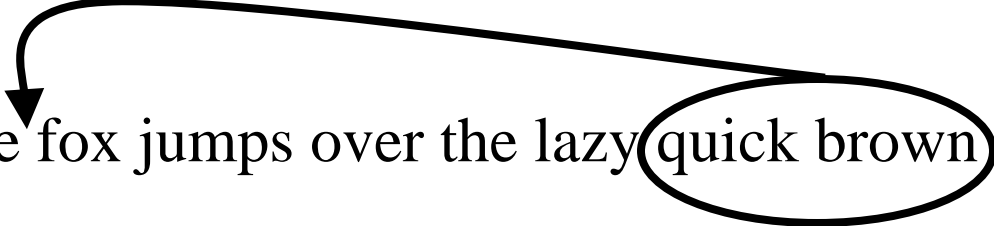
- Goals and sub-goals?
- Operators?
- Methods?
- Selection rules?

GOMS example II

(From HCI Models, Theories and Frameworks, J. Carroll)

- Using a text editor edit the following text as shown

The fox jumps over the lazy(quick brown)dog.

A diagram illustrating a text editing task. The sentence "The fox jumps over the lazy(quick brown)dog." is shown. The words "quick brown" are circled with a black oval. A black arrow starts from the top of the circle and points to the word "lazy", indicating a deletion and insertion operation.

- Analysis?

* Expansion of MOVE-TEXT goal

GOAL: MOVE-TEXT

- GOAL: CUT-TEXT
- • GOAL: HIGHLIGHT-TEXT
- • • [select** : GOAL: HIGHLIGHT-PHRASE-COMPOSED-OF-WORDS
- • • MOVE-CURSOR-TO-FIRST-WORD 1.10
- • • DOUBLE-CLICK-MOUSE-BUTTON 0.40
- • • MOVE-CURSOR-TO-LAST-WORD 1.10
- • • SHIFT-CLICK-MOUSE-BUTTON 0.40
- • • VERIFY-HIGHLIGHT 1.35
- • • GOAL: HIGHLIGHT-ARBITRARY-TEXT
- • • • MOVE-CURSOR-TO-BEGINNING-OF-TEXT
- • • • PRESS-MOUSE-BUTTON
- • • • MOVE-CURSOR-TO-END-OF-TEXT
- • • • RELEASE-CLICK-MOUSE-BUTTON
- • • • VERIFY-HIGHLIGHT]
- • GOAL: ISSUE-CUT-COMMAND
- • • MOVE-CURSOR-TO-EDIT-MENU 1.10
- • • CLICK-MOUSE-BUTTON 0.20
- • • MOVE-CURSOR-TO-CUT-ITEM 1.10
- • • VERIFY-HIGHLIGHT 1.35
- • • CLICK-MOUSE-BUTTON 0.20
- GOAL: PASTE-TEXT
- • GOAL: POSITION-CURSOR-AT-INSERTION-POINT
- • • MOVE-CURSOR-TO-INSERTION-POINT 1.10
- • • CLICK-MOUSE-BUTTON 0.20
- • • VERIFY-POSITION 1.35
- • GOAL: ISSUE-PASTE-COMMAND
- • • MOVE-CURSOR-TO-EDIT-MENU 1.10
- • • CLICK-MOUSE-BUTTON 0.20
- • • MOVE-CURSOR-TO-PASTE-ITEM 1.10
- • • VERIFY-HIGHLIGHT 1.35
- • • CLICK-MOUSE-BUTTON 0.20

TOTAL TIME PREDICTED (SEC)

16.25

Is all this feedback in order?

Issuing commands will be used a lot! can we shorten this procedure? Consider keyboard shortcuts.

Keystroke Level Model (KLM)

- Describe the task using the following operators:

- K: pressing a key or a pressing (or releasing) a button

$$t_K = 0.08 - 1.2s$$

- P: pointing

$$t_P = 1.1s \text{ (without button press)}$$

- H: Homing (switching device)

$$t_H = 0.4s$$

- D(n,l): Drawing segmented lines

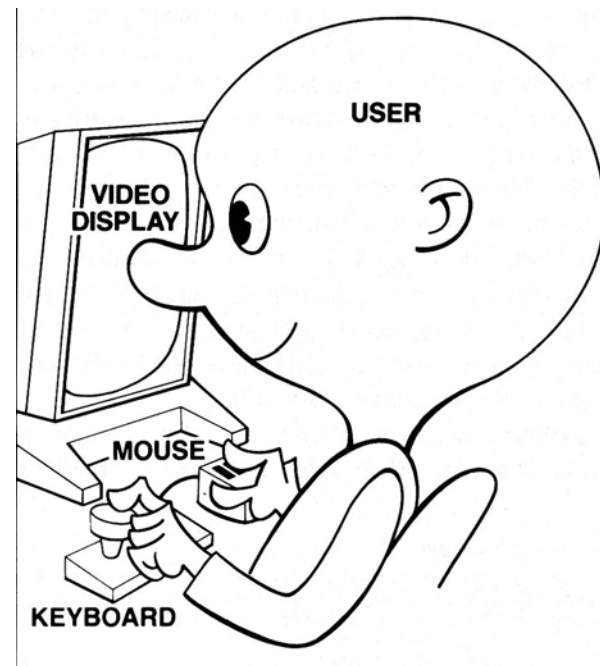
$$t_D = 0.9*n + .16*l s$$

- M: Mentally prepare

$$t_M = 1.35s$$

- R(t): system response time

$$t_R = t$$



How to use KML

- Encode using all physical operator (K, P, H, D(n,l), R(t))
- Apply KML rules [0-4]
- Transform R followed by an M
 - If $t \leq t_M$: $R(t) \rightarrow R(0)$
 - If $t_M < t$: $R(t) \rightarrow R(t - t_M)$
- Compute the total time by simply adding all times
 - Will describe expert user behavior

KLM heuristic rules (Raskin's)

0: Insert M

- *In front of all K*
- *In front of all P's selecting a command*

1: Remove M between *fully anticipated* operators

- $PMK \rightarrow PK$

2: if a string of MKs belong to *cognitive unit* delete all M but first

- $4564.23: MKMKMKMKMKMKMK \rightarrow MKKKKKKK$

3: if K is a *redundant terminator* then delete M in front of it

- $\swarrow\swarrow: MKMK \rightarrow MKK$

4a: if K terminate a constant string (command name) delete the M in front of it

- $cd\swarrow: MKKMK \rightarrow MKKK$

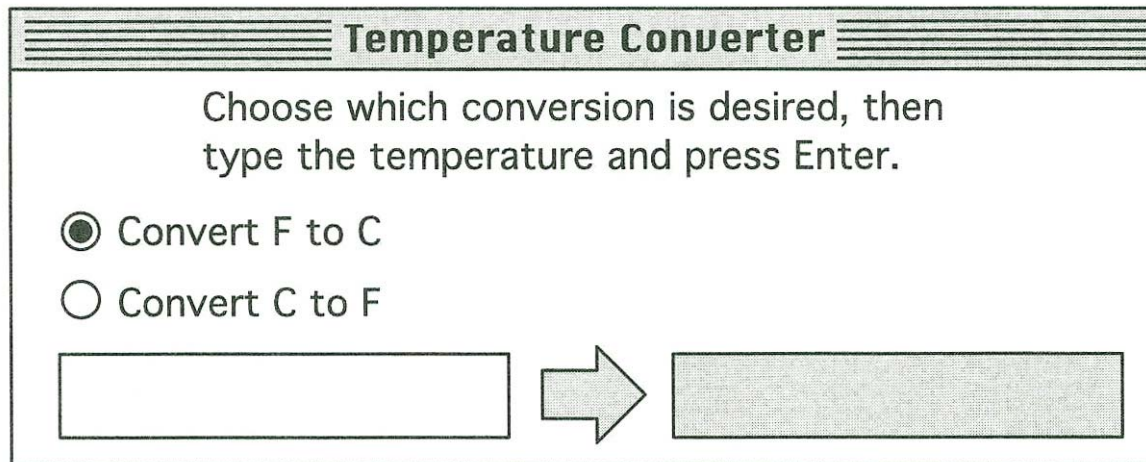
4b: if K terminate a variable string (parameter) keep the M in front of it

- $cd\ class\swarrow: MKKKMKKKKKMK \rightarrow MKKKMKKKKKMK$

Converting temperature: design 1

(“Humane Interface”, Raskin)

- Convert 92.5F to Celsius



Temperature Converter

Choose which conversion is desired, then type the temperature and press Enter.

Convert F to C

Convert C to F

→

Assume the focus is on the dialog box, so typing on the keyboard will enter text in the text field directly

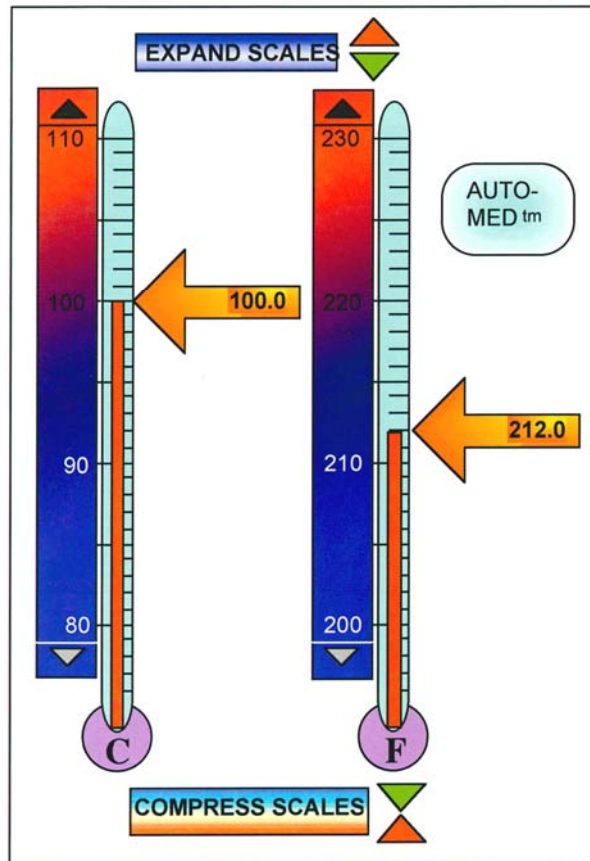
MKKKKMK (3.7s)

Average: 5.4s

HMPKHMKKKKMK (7.15s)

Converting temperature: design 2

(“Humane Interface”, Raskin)



HMPKPK (4.35s)

Average: 13.1s

HMPKSKMPKSKMPKSKMPKPK (21.9s)

Converting temperature: design 3

(“Humane Interface”, Raskin)

- Simple text interface with the following prompt:

“To convert temperatures, type the numeric temperature, followed by C if it is in degrees Celsius or F if it is in degrees Fahrenheit. The converted temperature will be displayed”

MKKKKMK (3.7s)

Average: 3.7s

Converting temperature: design 4

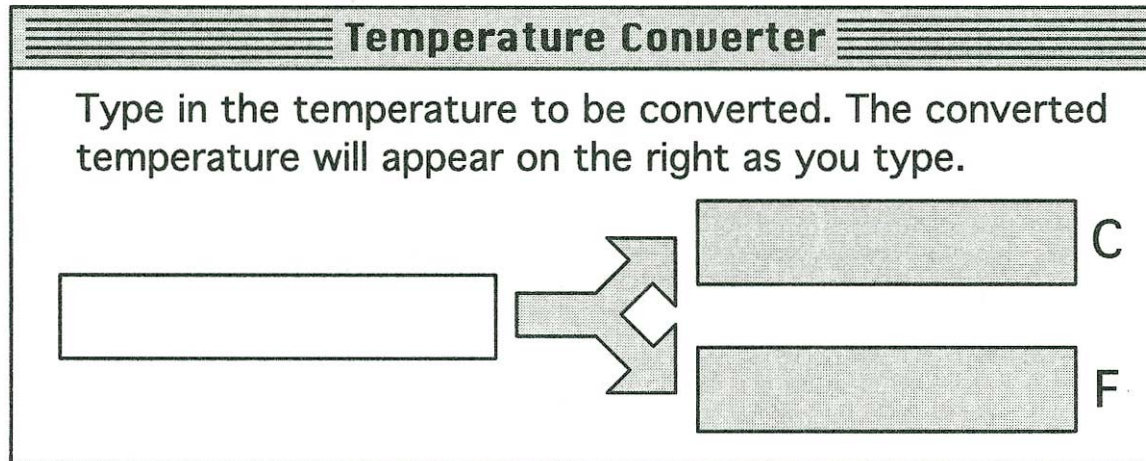
(“Humane Interface”, Raskin)

Temperature Converter

Type in the temperature to be converted. The converted temperature will appear on the right as you type.

C

F

The image shows a window titled "Temperature Converter". Inside the window, there is a line of text: "Type in the temperature to be converted. The converted temperature will appear on the right as you type." Below this text is a single rectangular input field. To the right of the input field is a large, stylized arrow pointing to the right. This arrow splits into two paths, each leading to a rectangular output field. The top output field is labeled with the letter "C" and the bottom output field is labeled with the letter "F".

MK KKK (2.15s)

Average: 2.15s

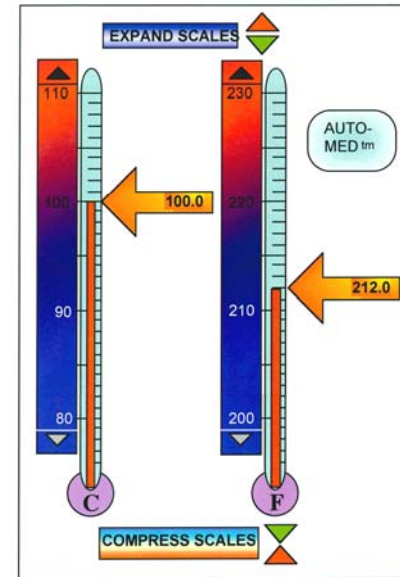
Pros and Cons

Temperature Converter

Choose which conversion is desired, then type the temperature and press Enter.

Convert F to C
 Convert C to F

→



“To convert temperatures, type the numeric temperature, followed by C if it is in degrees Celsius or F if it is in degrees Fahrenheit. The converted temperature will be displayed”

Temperature Converter

Type in the temperature to be converted. The converted temperature will appear on the right as you type.

→ C
 → F