Examples for GOMS and KLM-GOMS

GOMS: example

- **File & directory operations:**
  - Delete a file, move a file, delete a directory, move a directory.

- **GOMS analysis – File & directory operations:**
  - Method for goal: delete a file.
    - Step 1. drag file to trash.
    - Step 2. Return with goal accomplished.
  - Method for goal: move a file.
    - Step 1. drag file to destination.
    - Step 2. Return with goal accomplished.
  - Method for goal: delete a directory.
    - Step 1. drag directory to trash.
    - Step 2. Return with goal accomplished.
  - Method for goal: move a directory.
    - Step 1. drag directory to destination.
    - Step 2. Return with goal accomplished.

GOMS: example

- **GOMS analysis – File & directory operations - a better version:**
  - Method for goal: delete an object.
    - Step 1. drag object to trash.
    - Step 2. Return with goal accomplished.
  - Method for goal: move an object.
    - Step 1. drag object to destination.
    - Step 2. Return with goal accomplished.

- **GOMS analysis – the drag operation**
  - Method for goal: drag item to destination.
    - Step 1. Locate icon for item on screen.
    - Step 2. Move cursor to item icon location.
    - Step 3. Hold mouse button down.
    - Step 4. Locate destination icon on screen.
    - Step 5. Move cursor to destination icon.
    - Step 6. Verify the destination icon.
    - Step 7. Release mouse button.
    - Step 8. Return with goal accomplished.

KLM- GOMS: introduction

- **Calculates task execution time using pre-established keystroke-level primitive operators.**

- **Six types of operators:**
  - K: to press a key or a button
  - P: to point with a mouse to a target on a display
  - H: to home hands on keyboard or other device
  - D: to draw a line segment on a grid
  - M: to mentally prepare to do an action or closely related series of primitive actions.
  - R: to symbolize the system response time during which the user has to wait for the system.

- **Each of the six operators has an estimate time or simple approximation function.**
  - Time to execute is empirically defined:
    - $T_{execute} = T_k + T_P + T_H + T_D + T_M + T_R$

- **Heuristics for adding M**

KLM- GOMS: operator times

Operator	description	time (sec)
K	press key or button (shift or control key count separately)	
	best typist (135 wpm)	.08
	good typist (90 wpm)	.12
	average typist (55 wpm)	.22
	average typist (40 wpm)	.28
	typing complex codes	.75
P	point with mouse to target on display (Fitts's Law)	1.10
	Clicking the mouse or similar device (B)	.10/.20
H	home hand on keyboard or device	.40
D(n,l)	draw *n* straight-line segments of total length *l* cm	
	(calculated for a square .56 cm grid)	***.9n*** +.16*l*
M	mentally prepare/respond	1.35

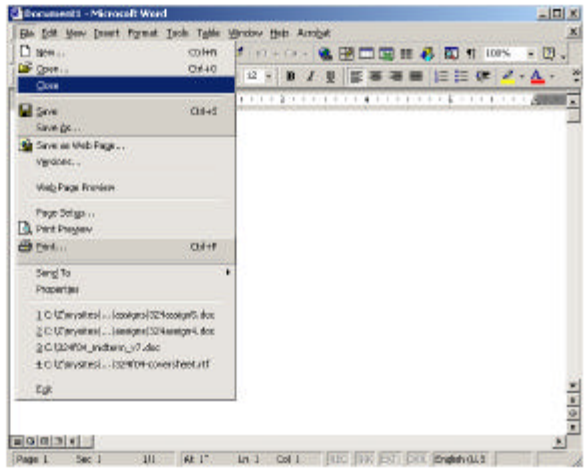
KLM- GOMS: additional operator times

Operator	description	time (sec)
	Move eyes to location on screen	2.3
	Retrieve item from memory	12
	Select among methods	12

KLM- GOMS: example

- **Closing a window**
  - **Either use the close button, or press Ctrl+W**

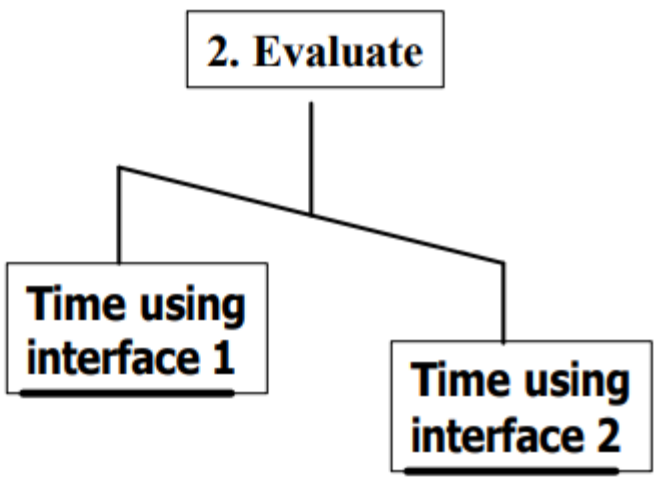
```
GOAL: ICONISE-WINDOW
[select
   GOAL: USE-CLOSE-METHOD
   .     MOVE-MOUSE-TO- FILE-MENU
   .     PULL-DOWN-FILE-MENU
   .     CLICK-OVER-CLOSE-OPTION
   GOAL: USE-CTRL-W-METHOD
         PRESS-CONTROL-W-KEY]
```



  - **Comparing both techniques (assuming hand starts on mouse)**

1. Predict

USE-CTRL-W-METHOD		USE-CLOSE-METHOD	
H[to kbd]	0.40	P[to menu]	1.1
M	1.35	B[LEFT down]	0.1
K[ctrlW key]	0.28	M	1.35
		P[to option]	1.1
		B[LEFT up]	0.1
Total	**2.03 s**	**Total**	**3.75 s**



- There can be several paths to complete a task.
  - Example: Deleting a file
    - Drag & drop into a trash bin
    - Right click and click the ‘delete’ option
    - Select the file and click the delete button
    - Etc.
- Different approaches take different times to complete the same task.

- KLM-GOMS approach will help you to choose the most appropriate path to complete the task for your user interface.

https://en.wikipedia.org/wiki/Keystroke-level_model