using formalism in HCI

from cognitive models
to placemats

what to model

- users
  - cognitive models
  - task models
- system
  - behaviour
  - architectural structure
- world
  - domain models

notations

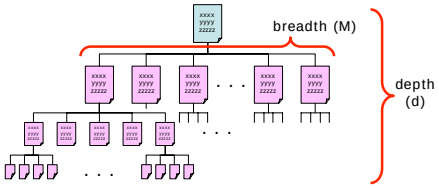
- graphical
  - digital watch STNs, Petri Nets, CTT, UML
- textual
  - production rules (used in UIMS and cog. models)
  - mathematical formulae, process algebras
- plain old sums
  - back of the envelope/placemat calculations

placemat math - menu sizes

- on-screen menus
  - e.g. web site navigation
- how many items per screen?
- frequent misapplication of Miller 7±2
- but how many is right?

placemat math (ii)

- menu tree has N items
- number of items per screen = M (breadth)
- depth (d) = $\log_2(N) / \log_2(M)$



placemat math (iii)

T_{total} – time to find an item
$= (T_{display} + T_{select}) \times d$

$T_{display}$ – time to display screen (fixed)

T_{select} – time to select menu item
$= A + B \log(M)$ (Fitts' Law)

$T_{total} = (T_{display} + A + B \log(M)) \times \log(N) / \log(M)$

cancel

$= ((T_{display} + A) \times \log(N)) / \log(M) + B \log(N)$

best menu size?

$T_{total} = ((T_{display} + A) \times \log(N)) / \log(M) + B \log(N)$

- larger M means shorter total time
- the bigger the better!

N.B. other factors

- visual search (linear if not expert)
- error rates
- minimum selectable size
- effective organisation of menu items

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types of system model

- dialogue – main modes
- full state definition

specific system

- abstract interaction model

generic issues