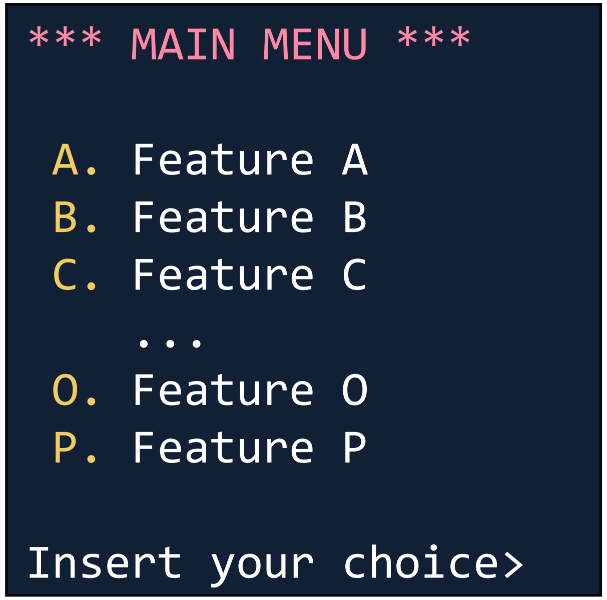
MHP: Why?

- You can see an interaction as a «program» for the MHP
- You can then «run» it on the MPH to estimate completion time!
  - Humans differ from each other. MPH allows to tune parameters (e.g.: processor cycle times) to target humans with different abilities

MHP: Example application

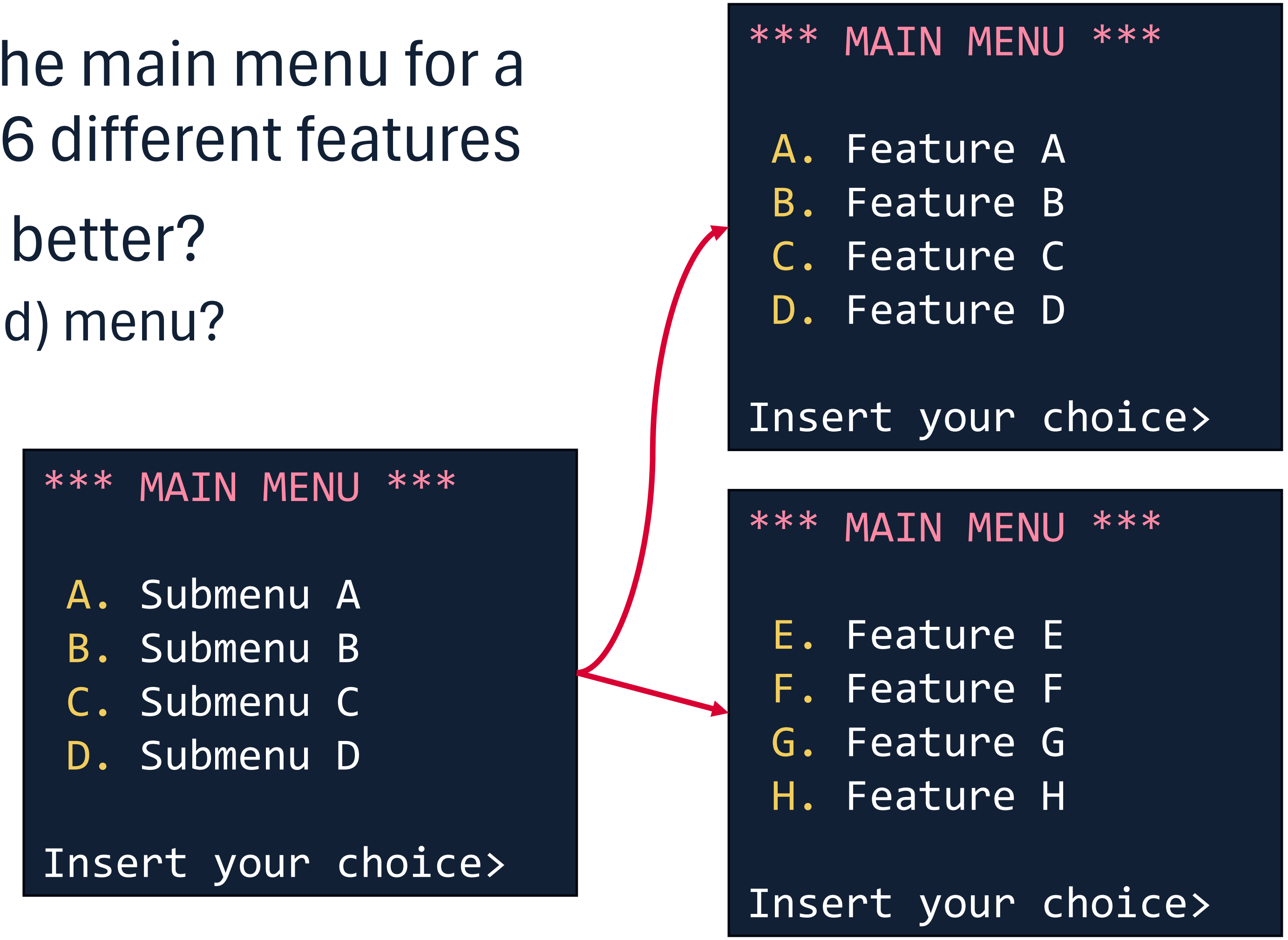
- Suppose we are designing the main menu for a command-line utility with 16 different features
- Which alternative would be better?
  - 1x16 (breadth) or 4x4 (nested) menu?



```
*** MAIN MENU ***

 A. Feature A
 B. Feature B
 C. Feature C
    ...
 O. Feature O
 P. Feature P

Insert your choice>
```



```
*** MAIN MENU ***

 A. Submenu A
 B. Submenu B
 C. Submenu C
 D. Submenu D

Insert your choice>
```

```
*** MAIN MENU ***

 A. Feature A
 B. Feature B
 C. Feature C
 D. Feature D

Insert your choice>
```

```
*** MAIN MENU ***

 E. Feature E
 F. Feature F
 G. Feature G
 H. Feature H

Insert your choice>
```

MHP Example: Breadth (1x16) Menu

```
foreach item in menu:
  Execute eye movement to item
  Perceive item text, transfer to WM
  Retrieve meaning of item, transfer to WM
  Match code from displayed to needed item
  if(Decide on match)
    break

Execute eye movement to menu item letter
Perceive menu item letter, transfer to WM
Decide on key
Press key in response
```

Average number of iterations in a serial search on 16 items

$$\left.\begin{array}{l}\tau_M\\ \tau_P\\ \tau_C\\ \tau_C\\ \tau_C\end{array}\right\} \quad (\tau_M+\tau_P+3\tau_C)\cdot(16+1)/2$$

$$\left.\begin{array}{l}\tau_M\\ \tau_P\\ \tau_C\\ \tau_M\end{array}\right\} \quad 2\tau_M+\tau_P+\tau_C$$

$$T=(\tau_M+\tau_P+3\tau_C)\cdot(16+1)/2+2\tau_M+\tau_P+\tau_C$$

$$=(70+100+3\cdot 70)\cdot 8{,}5+2\cdot 70+100+70=\mathbf{3540\ ms}$$

MHP Example: Depth (4x4) Menu

- Same procedure and steps as the depth menu
- But this time we do 2 serial searches over 4 items

$$
\begin{aligned}
T &= 2 \cdot [(\tau_M + \tau_P + 3\tau_C) \cdot (4+1)/2 + 2\tau_M + \tau_P + \tau_C] \\
&= 2 \cdot [(70 + 100 + 3 \cdot 70) \cdot 2{,}5 + 2 \cdot 70 + 100 + 70] = \boldsymbol{2520\, ms}
\end{aligned}
$$

- The 4x4 menu is predicted to be ~30% faster than the 1x16 one!