Exercise 1

TDT4137

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a

Assuming eye movement is not necessary, as one normally will detect that the brake lights are lit without looking directly at them.

Event	**Time passed**
Break light turns red	$\tau = 0.00$
Perceptual processor fetches the image into VIS and WM	$\tau = \tau_p$
Cognitive processor generates the motor command to press the brakes	$\tau = \tau_p + \tau_c$
Motor processor executes the command	$\tau = \tau_p + \tau_c + \tau_m$
DONE	$\tau = \tau_p + \tau_c + \tau_m$ $\tau = 100ms + 70.0ms + 70.0ms$ $\tau = 240ms$

b

Assuming eye movement is not necessary.

Event	**Time passed**
Flag appears on monitor	$\tau = 0.00$
Perceptual processor fetches the image into VIS and WM	$\tau = \tau_p$
Fetching the semantic name from LTM to WM	$\tau = \tau_p + \tau_c$
Fetching that the flag is Scandinavian from LTM	$\tau = \tau_p + \tau_c + \tau_c$
DONE	$\tau = \tau_p + \tau_c + \tau_c$ $\tau = 100ms + 70.0ms + 70.0ms$ $\tau = 240ms$

c

The Index of Difficulty describes the difficulty of performing a movement task accurately. According to Fitts, the Index of Difficulty is $log_2(D/S + 0.5)$, where D is the distance to the target and S is the size of the target.

Using Shannon's version of Fitts' law to calculate the duration of moving the cursor to the menu bar, we get the following results:

Windows: $50.0 + 150 * log_2(80.0/5.00 + 1.00) = 663ms$

Machintosh: $50.0 + 150 * log_2(80.0/50.0 + 1.00) = 257ms$

d

To create an illusion of continuity in time, there has be be more images than perceptual cycles per time unit. Frame rate (fr) has to be bigger than $1/\tau_p$. This way the stream of perceptual images 'melts' together to one continuous impression.

$fr > 1.00/\tau_p = 1.00/100ms = 10.0/s$

The frame rate has to be larger than 10 frames per seconds.