WE HAVE TIME REQUIREMENTS

ISSUES WITH INTERACTIVE SYSTEMS THAT DO NOT MATCH USER TIME REQUIREMENTS:

1. Viewed as less effective

2. Seen as unresponsive
   - The MOST important factor in determining user satisfaction

IN THIS CHAPTER:

- What are responsive systems?

- How long perceptual and cognitive processes take

- The real-time deadlines that interactive systems must abide by

4

WHAT IS A RESPONSIVE INTERACTIVE SYSTEM

- Responsiveness is related to, but different from performance
  - Performance is measured in computations per unit time
- Responsiveness is measured in how well a system adheres to human time requirements
- Responsive systems give users feedback on whether an action is happening, or a command was executed, regardless of how long it will take

PROPERTIES OF RESPONSIVE INTERACTIVE SYSTEMS

- Quickly let users know their input was received.

- Give users an estimate of waiting time.

- Does not block users out of other tasks.

- Schedules tasks effectively.

- Allows housekeeping tasks to be run in the background.

- Prepares ahead of time the most common requests.

TIME CONSTRAINTS OF THE BRAIN

- Shortest gap of silence that we can detect in a sound: 1 millisecond

- Shortest time a visual stimulus can be shown and still affect us: 5 milliseconds

- Speed of flinch reflex: 80 milliseconds

- Perceptual cycle time: 100 milliseconds

- Threshold for perceptual "locking" of events and sounds: 100 milliseconds

- Duration of saccadic masking: 100 milliseconds

TIME CONSTRAINTS OF THE BRAIN

- Maximum interval between events for perception that one event caused another event: 140 milliseconds

- Time to subitize up to four to five items in our visual field: 200 milliseconds

- Editorial "window" within which the brain edits the presence and order of events: 200 milliseconds

- Attentional "blink" following recognition of an object: 500 milliseconds

- Visual-motor reaction time: 700 milliseconds

TIME CONSTRAINTS OF THE BRAIN

- Maximum duration of silent gap between turns in person-to-person conversation: About 1 second

- Duration of unbroken attention to a single, unit task: 6–30 seconds

USING THE DEADLINES IN DESIGN

- Rather than memorize the wide range of time requirements for different perceptual and cognitive processes, we group many of them into easier categories to design for.

- Each category is separated by a factor of 10, which makes the series easier for designers to remember

0.001 SECOND:

- Humans can detect a break of as small as 1 millisecond in a sound.

- When designing anything related to audio, it is important to make sure that whatever we use to generate the sound avoids interruptions, otherwise it will produce noticeable breaks in the sound.

- 1 millisecond is thus the maximum allowed time for a break or drop to occur in playing a sound.

0.01 SECOND:

- This duration is so small it only allows for subliminal perception.

- One can induce familiarity with symbols subconsciously by exposing users to one for 10 milliseconds.

- In generating different sounds, separate tones played with less than a 10-millisecond gap will generate different pitches

- 10 milliseconds is the maximum lag time allowed for electronic writing or drawing tools

0.1 SECOND:

- The maximum wait allowed to keep the perception of cause and effect in actions.

- Amount of time it takes for users to count 4 items

- Maximum time interval between frames for animation to look continuous and smooth

1 SECOND:

- Maximum amount of time a system has to either carry out a user's task, or give an estimate for how long it will take.

- Minimum required wait time after showing important information before allowing the user to continue.

10 SECONDS:

- Approximate unit of time that users break up larger tasks into.

- Maximum amount of time users are willing to spend to set up a process.

- Maximum amount of time allowed for one step in an install or setup wizard.

100 SECONDS:

- Typically the largest time unit designers care about.

- Important for designing software where the user needs to make important decisions:

  - All information a user needs to make a decision must be able to be found within the 100 second time limit. If not, the way the information is presented must be changed.

ADDITIONAL GUIDELINES

- USE BUSY INDICATORS:
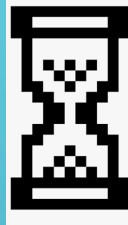
- USE PROGRESS INDICATORS:
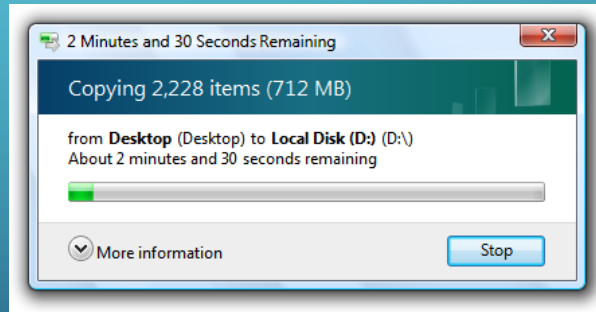
ADDITIONAL GUIDELINES

- Its better to have delays between tasks than during tasks:
  - An interruption during a unit tasks is more bothersome to the user than if it takes a longer time after the task is completed for the next one to be able to be started

- Important information should be shown first:
  - Allows user to spend less time looking for relevant info

- Fake heavyweight computations when they are unimportant

- Preempt common tasks

ADDITIONAL GUIDELINES

- Process input according to priority:
  - Allows for interrupts of longer processes, even if the command to stop was given after the command to load

- Value time compliance over quality of work

- When designing for the web, maximize responsiveness:
  - Minimize size and number of images, allow for thumbnail images to display instead
  - Style pages with CSS so browsers can display them faster
  - Use less intensive, built in browser components instead of custom ones

CONCLUSION AND QUESTIONS

SOURCES

- https://www.google.com/url?sa=i&url=https%3A%2F%2Fwww.istockphoto.com%2Fphotos%2Fbaseball-glove&psig=AOvVaw0IaIjtUm3wtuE6rr5ZfWkK&ust=1668213604308000&source=images&cd=vfe&ved=0CA8QjRxqFwoTCPitylzypPsCFQAAAAAdAAAAABAE

- https://www.google.com/url?sa=i&url=https%3A%2F%2Fwww.dreamstime.com%2Fphotos-images%2Fbaseball.html&psig=AOvVaw20MAlpJ3X8AipChTOgw6aa&ust=1668213495073000&source=images&cd=vfe&ved=0CA8QjRxqFwoTCPixjaz3pPsCFQAAAAAdAAAAABAD

- https://www.google.com/url?sa=i&url=https%3A%2F%2Fwww.epicgames.com%2Ffortnite%2Fen-US%2Fcreative%2Fdocs%2Floadout-lobby-in-fortnite-creative&psig=AOvVaw2xOwX6X783LzaxEy6mAG4P&ust=1668215177966000&source=images&cd=vfe&ved=0CA8QjRxqFwoTCOCgz_r3pPsCFQAAAAAdAAAAABAE

- https://www.google.com/url?sa=i&url=https%3A%2F%2Flearn.microsoft.com%2Fen-us%2Fwindows%2Fwin32%2Fuxguide%2Fprogress-bars&psig=AOvVaw2tMROTarWEVssHqS0Ncb4I&ust=1668230289232000&source=images&cd=vfe&ved=0CA8QjRxqFwoTCNDQrKCwpfsCFQAAAAAdAAAAABAE

- https://www.google.com/url?sa=i&url=https%3A%2F%2Fwww.pngitem.com%2Fmiddle%2FJxwoxo_windows-hourglass-hd-png-download%2F&psig=AOvVaw21vJhLldQvE2JNzPmeTqay&ust=1668230086411000&source=images&cd=vfe&ved=0CA8QjRxqFwoTCKC0wYS0pfsCFQAAAAAdAAAAABAD