Today’s Lecture

- Hall of Shame / Fame
  - Tabs – good or evil?
- C# Tips / Tricks
  - Side panes
- Finish up Monday
  - MV
  - Observer / Pub-Sub
  - Human Information Processing

Reminders
- Blog Post (Week)
- Homework 5
Tabs – Good?
A Tab Too Far?
Discussion: Good / bad examples of tabs?
Q: How can I make sidebars like visual studio?
A: Hidden controls
Outer Grid Layout
Rotating the Buttons

```
<StackPanel Grid.Row="1" Grid.Column="1"
Grid.RowSpan="1" Orientation="Horizontal">
  <Button Click="clickShowTransactionParticipants"
    RenderTransformOrigin="0.5,0.5" Height="20"
    Width="100">Participants
    <Button.RenderTransform>
      <RotateTransform Angle="90" />
    </Button.RenderTransform>
  </Button>
</StackPanel>
```
Inner Grid
Put containers in the same position

<Grid Grid.Row="0" Grid.RowSpan="5"
     Grid.Column="2" x:Name="pane1">
    <!-- Controls go here -->
</Grid>

<Grid Grid.Row="0" Grid.RowSpan="5"
     Grid.Column="2" x:Name="pane2"
     Visibility="Hidden">
    <!-- Controls go here -->
</Grid>
private void clickShowTransactionOverall(object sender, RoutedEventArgs e) {
    transEditOverallView.Visibility = Visibility.Visible;
    transEditParticipants.Visibility = Visibility.Hidden;
    transEditInput.Visibility = Visibility.Hidden;
    transEditOutput.Visibility = Visibility.Hidden;
}

React to button press
Hide the other containers
Show the one you want to see

Could you do this as a trigger?
Human Information Processing

- Perception
- Motor skills
- Memory
- Decision Making
- Attention
- Vision

How might this impact our design?
Model Human Processor

Card, Moran, Newell – 1983
Wickens - 1984
Why human processor?

☐ We’re computer scientists
  ■ Translate human to computer
  ■ Interested in
    ☐ Processing rates
    ☐ Buffer size
    ☐ Pipeline / parallelism
Memory properties

- Encoding: Type of things stored
- Size: Number of things to store
- Decay time: How long things last
Short-Term Memory Store

- **Visual information store**
  - Encoded as physical image
  - Size ~ 17 [7-17] letters
  - Decay ~ 200 ms [70-1000 ms]

- **Auditory information store**
  - Encoded as physical sound
  - Size ~ 5 [4.4-6.2] letters
  - Decay ~ 1500 ms [900-3500 ms]
Processing

- Cycle time for processors
  - TP ~ 100 ms [50-200 ms]
  - TC ~ 70 ms [30-100 ms]
  - TM ~ 70 ms [25-175 ms]

- Concepts – MHP
  - Slowman, Middleman, Fastman
  - Fastman may be 10x faster than Slowman
Perceptual Fusion

- Two stimuli within the same PP cycle (Tp ~ 100ms) **appear fused**

- Consequences
  - 1/ Tp frames/sec is enough to perceive a moving picture
  - 5 fps – Slowman, 10 fps Middleman
    20 fps Fastman
  - Fastman = peak + ideal conditions
  - Computer response < Tp feels instantaneous
  - Causality is strongly influenced by fusion
Bottom up vs. Top down Perception

- Bottom-up uses features of stimulus
- Top-down uses context
  - Temporal, spatial
  - Draws on long-term memory

TAE CAT
Chunking

- “Chunk”: unit of perception or memory
- Chunking depends on presentation and what you already know
  - B M W R C A A O L I B M F B I
  - MWR CAA OLI BMF BIB
  - BMW RCA AOL IBM FBI
- 3-4 digit chunking is ideal for encoding unrelated digits
Attention and Perception

- Spotlight metaphor
  - Spotlight moves serially from one input channel to another
  - **Visual dominance**: easier to attend to visual channels than auditory channels
  - All stimuli within spotlighted channel are processed in parallel
- Whether you want to or not
Say the Colors

Book
Pencil
Slide
Window
Car
Hat
Say the Colors

Green
Orange
Red
Black
Pink
Blue

Stroop effect

Reinforce or interfere?
Cognitive Processing

- Cognitive processor
  - compares stimuli
  - selects a response

- Types of decision making
  - Skill-based
  - Rule-based
  - Knowledge-based
Hick-Hyman Law of Choice Reaction Time

- Reaction time depends on information content of stimulus
  - $RT = c + d \log_2 \frac{1}{Pr(\text{stimulus})}$

- e.g., for N equiprobable stimuli, each requiring a different response:
  - $RT = c + d \log_2 N$
Speed / Accuracy Tradeoff

- Accuracy varies with reaction time
  - Can choose any point on curve
  - Can move curve with practice
Divided Attention (Multitasking)

- Resource metaphor
  - Attention is a resource that can be divided among different tasks simultaneously

- Multitasking performance depends on:
  - Task structure
    - Modality: visual vs. auditory
    - Encoding: spatial vs. verbal
  - Component: perceptual/cognitive vs. motor vs. WM
  - Difficulty
    - Easy or well-practiced tasks are easier to share
Discussion

☐ Prefer silent room to study?
☐ Prefer music while studying?
☐ Prefer the student union?
Questions?

- Weekly Blog
- Homework 5 (Posted Wed)