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?

C# Tips / Tricks

- 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>
</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>
```

Change visibility

```
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?
Why human processor?
- We're computer scientists
  - Translate human to computer
  - Interested in
    - Processing rates
    - Buffer size
    - Pipeline / parallelism

Memories
- 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

Chunking

- "Chunk": unit of perception or memory
- Chunking depends on presentation and what you already know
  - BMW RCA AOL IBM FBI
  - MWR CAA OLI BMF BIB
- 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

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)