## Tablet PC

**CSE 490 RA**

### Key features
- Form factor
- Size
- Mobility
- Pen Input
  - Natural Ink
  - Stand Alone
  - General Purpose

### Tablet PC History
- GRIDPad 1989
- Go Pen point 1991
- Pen Windows 1992
- Newton 1993
- Palm Pilot 1996

### Tablet PC Hardware Requirements
- Digitizer
  - Detect Hovering Pen
  - Sample at least 100 times per second
  - Support resolution of 600 dpi
- Two second resume from standby
- Landscape to portrait without reboot
- Ctrl-alt-del without keyboard

### Why might pen computing succeed?
- Dramatic changes in hardware
  - Digitizers
  - CPU Speeds
  - Batteries
- Digital Ink Recognition
  - This presentation was created without a keyboard on a turbulent airplane
  - Digital Ink treated as first class type

### TPC Software
- Digital Ink Applications
- Ink SDK
- Tablet Input Panel
  - Computing without the keyboard
- Extension of Windows XP
  - Must run windows apps
Hardware landscape
- Many vendors
- Range of form factors
- What about the keyboard?
- Laptop plus vs. slate
- Convertible
  - Acer, Toshiba
- Detachable keyboard
  - HP/Compaq, motion computing

Usability Studies
- Pen UI vs. Conventional Widows UI
- Ink as ink
  - User studies showed that often users do not convert to handwriting
- Visual distinction for inkable regions
- Input Modality
  - Do actions charge based on state
  - Many believe modeless UI’s are desirable

Digitizer issues
- Digitizer types
  - Resistive, single or double layer
  - Electro–static
  - Electro-magnetic
- Digitizer distortion
- Parallax

Pen usability
- Targeting
  - MS determined that .5cm is minimum
  - Many controls are smaller
  - Domains with much larger targeting range
    - Walking or talking
    - Bumpy airplane
- Double click
- Tap without drag
- Hovering

Pen Types
- Magnetic or Battery powered
- May have button
- Some active at both ends
  - Supports natural eraser metaphor

Handedness
- Users hand blocks menu/cursor
- Left vs. Right
- Tablet PC controls take handedness into account
- Control Panel /Tablet and Pen settings / settings
**Pen Actions**
- Hover
- Tap
- Double Tap
- Press and Hold
- Hold through
- Drag
- Hold-Drag
- Lasso
- Gesture

**Gestures**
- Control actions associated with pen movements
- InkCollector / InkOverlay provide gesture support
  - Recognized gestures fire event
- Issues / risks
  - Hard to learn (as keyboard shortcuts)
  - Serious problem in accidental triggering