

CPEN441: medium & hi-fidelity prototyping tools

Medium and high fidelity prototyping tools

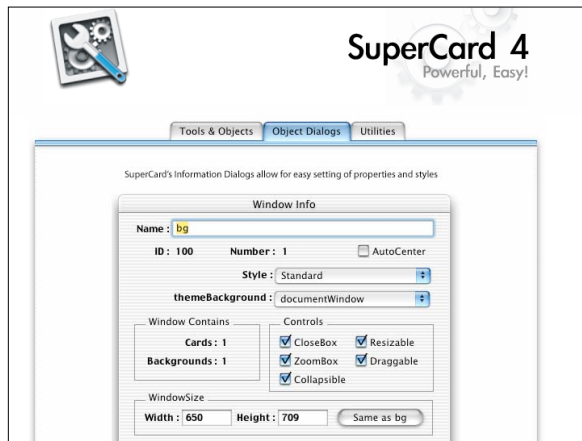
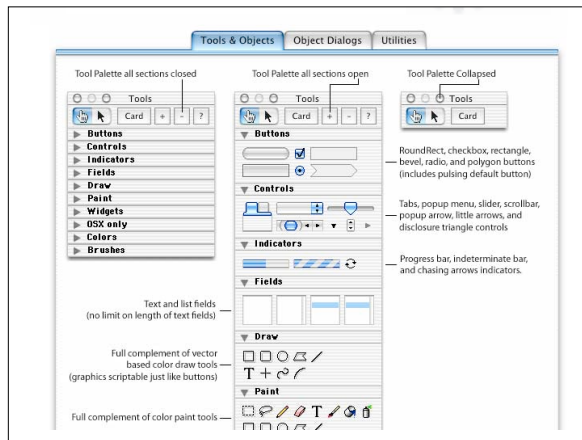
- drag-and-drop GUI toolkits for standard UI mockups
 - e.g. Hypercard, Visual Basic, gtk, Interface Builder, lots of others being added all the time
- scripting languages & interface libraries for additional flexibility
 - e.g. tcl/tk, python, vtk
- graphical languages for visualization and novel interface creation
 - Figma, Principle, AdobeXR, more coming all the time
- special purpose tools and environments
 - e.g. speech, haptics, Supercard/Revolution

2

HyperCard 1986

- original card stack metaphor
 - drag-and-drop tools for actions w/out scripting.
 - hyperlinks, behaviours (new!)
 - graphics, sound or movie
 - HyperTalk scripting language
- later:
 - AppleScript to launch, control, and exchange data with scriptable applications
 - web server capable; XCMDs, XFCNs, AppleScript
 - HyperCard server and browser client.

3



Visual Basic 1988

- progenitor 'Tripod' created by Alan Cooper, UI guru
 - authored "About Face!" & "The Inmates are Running the Asylum" (extracurricular reading)
- VB sold to MS applications division
 - morphed to Visual Basic for Applications
 - lingua franca of MS
 - loved by script kiddies worldwide...
- intended for fast prototyping/GUI building

IDE/Frameworks

- Microsoft: Visual studio.Net / Apple: Xcode
 - IDE for development
 - framework for integrating multi-language code base
 - drag-and-drop GUI-builder, scriptable
- weak points:
 - limited to graphical display for visualization
 - hard to use novel I/O: speech input, haptics etc.

7

the situation today

- HTML/XHTML + CSS for simple prototyping
 - AdobeXD, Principle, proto.io, Figma, Flex, HTML5, and more...
- more advanced features in Supercard:
 - text-to-speech, speech recognition, QuickTime, filmstrips, graphic import and export, MP3 playback etc.
- advanced / research UIs still require (scripting) language + libraries
 - Tool Command Language/Tool Kit (TCL/TK)
 - Python
 - JavaScript +++ support tools like React, node.js, next.js and more
 - still a need for C++, C#, Objective C
 - but that is coding, which we want to avoid!
- Code converters like Microsoft Power App, Figma code generators

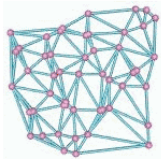
8

Visualization and Image Tool Kit (VTK & ITK)

- Open Source tool:
 - for 3D graphics, image processing, and visualization
 - C++ class library + several interpreted interface layers including TCL/TK, Java, and Python.
 - supported on Unix, PCs, Mac OSX

9

The Visualization Toolkit

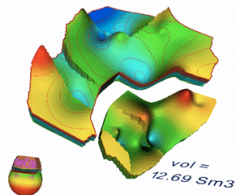


The Visualization ToolKit (VTK) is an open source, freely available software system for 3D computer graphics, image processing, and visualization used by thousands of researchers and developers around the world. VTK consists of a C++ class library, and several interpreted interface layers including Tcl/Tk, Java, and Python. Professional support and products for VTK are provided by [Kitware, Inc.](http://www.kitware.com) VTK supports a wide variety of visualization algorithms including scalar,

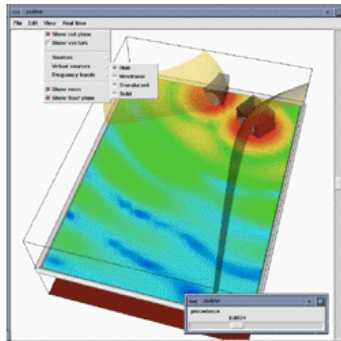
vector, tensor, texture, and volumetric methods; and advanced modeling techniques such as implicit modelling, polygon reduction, mesh smoothing, cutting, contouring, and Delaunay triangulation. In addition, dozens of imaging algorithms have been directly integrated to allow the user to mix 2D imaging / 3D graphics algorithms and data. The design and implementation of the library has been strongly influenced by object-oriented principles. VTK has been installed and tested on nearly every Unix-based platform, PCs (Windows 98/ME/NT/2000/XP), and Mac OSX Jaguar or later.

10

Volume Calculation



11



12



13

low/hi-fi toolkits for new interfaces

- There are a lot!
 - paper, Balsamiq, Axure, InVision, proto.io, Figma, Flinto, Powerpoint, html (or Dreamweaver), Java/Swing, Processing, modeling foam & hot-melt glue, Flash, Visual Basic, Photoshop, Arduino, found objects, tcl/tk, Python, POP
 - Each has different strengths and weaknesses, so best to have lots at your finger tips.
- Snack: Sound Toolkit for Tcl/Tk or Python
 - audio applications: playback, recording, file and socket I/O, sound visualization, e.g. waveforms and spectrograms.
 - developed to handle digital speech recordings, useful for general audio. <http://www.speech.kth.se/snack/>
- DART: Designers' Augmented Reality Toolkit (out of Georgia Tech)
- Groupkit: open source Groupware toolkit for Tcl/Tk
 - started at U Calgary (Saul Greenberg's GroupLab, 1992)
 - 2003 reincarnated: <http://www.groupkit.org/>
- Max/MSP/Jitter & pd
 - visual programming language for video and sound
- Game engines, e.g., Unity, Unreal

14

Summary

- Plethora of fast low and hi-fi prototyping tools available
- easy to learn, quick to get things going
- choose best one for level of fidelity and functionality needed
 - to address highest risk
- best to have multiple ones

15