

# Introduction To Window Management

## SIGGRAPH '88 Course #11

### *chair*

Jonathan E. Steinhart, XYZW Systems, Inc.

### *speakers*

Mark Callow, Silicon Graphics, Inc,

Richard J. Greco, Tektronix, Inc,

David LeValle, Sun Microsystems, Inc,

Robin Schaufler, Sun Microsystems, Inc,

Jonathan E. Steinhart, XYZW Systems, Inc.

## Contents

### Section 1 - Course Papers

- Chapter 1 Introduction
- Chapter 2 Window management "operating" systems
- Chapter 3 Area management
- Chapter 4 Device drivers for frame buffer devices
- Chapter 5 Device drivers for frame buffer devices with color maps and gamma correction
- Chapter 6 Device drivers for devices with graphics processors, hardware cursors, and overlays
- Chapter 7 Device drivers for video mixer devices
- Chapter 8 Graphics models
- Chapter 9 Task management and scheduling
- Chapter 10 Input
- Chapter 11 Application program interface
- Chapter 12 Toolkit model
- Chapter 13 Application program interface survey
- Chapter 14 Example applications
- Chapter 15 Future directions and trends

### Section 2 - Course Slides

### Section 3 - Related Papers

- *Techniques for Manipulating Arbitrary Regions*, Nola Donato and Robert Rochetti, Sun Microsystems, Incorporated.
- *Position Paper on the Importance and Application of Video Mixing Architectures*, Jack Grimes, Intel Corporation.
- *The Effect of the Operating System Environment on Window System Architecture*, James Gosling, Sun Microsystems, Incorporated.
- *NeWS: A Distributed and Extensible Window System*, James Gosling, Sun Microsystems, Incorporated.
- *X11/NeWS Design Overview*, Robin Schaufler, Sun Microsystems, Incorporated.
- *The X Window System*, Robert Scheifler and Jim Gettys, MIT Laboratory for Computer Science and Digital Equipment Corporation.
- *A Simple X.11 Client Program or How hard can it really be to write "Hello World"?*, David S. H. Rosenthal, Sun Microsystems, Incorporated, 1987.

## Chapter 1 - Introduction

### Introduction

This course is an introduction to the field of window management. Window management is treated as a relatively mature area in which the problems are understood, if not solved. A model is presented that partitions window management into a number of distinct areas. Each area is discussed, its problems examined, and a number of solutions are offered. Existing window systems serve as examples during the discussion.

This course is not a tutorial for the X window system™, NeWS™, or any other window management system. Instead, it is an introduction to the basic principles behind window management.

### Prerequisites

This course assumes that the student is familiar with graphics, raster in particular. Some of the material requires a cursory knowledge of graphics hardware. A knowledge of operating systems and operating system principles is essential. A familiarity with the UNIX™ is particularly helpful.

### The Course Notes

There are three sections to the course notes. The first section contains the papers from which the presentation is extracted. The second section contains a copy of the slides that are used in the presentation. There are likely to be some minor differences between the slides in the course notes and the slides that you see due to the early deadline for course notes. The final section contains papers related to the topics that are discussed. This section is mostly limited to papers that are not published elsewhere.

### History

Some of the reviewers of the course proposal felt that the course should include a history of window systems. After much deliberation I concluded that the history is no longer of great importance. That isn't to say that the mistakes

and successes are not important; just that it is no longer significant to spend time telling you that window management originated at Xerox.<sup>1</sup> After all, how many people in the computer graphics field know who invented the cathode ray tube? There is a lot of material to cover in a short time, so we'll skip the history and get right to the technical matters.

---

The X window system is a trademark of MIT.

NeWS is a trademark of Sun Microsystems, Incorporated.

UNIX is a trademark of AT&T Bell Laboratories.

---

<sup>1</sup> There, I did it!