

CS101 Introduction to Computing

# Lecture 13

Application Software



The focus of the last lecture was  
on  
Operating Systems



# Learning Goals for Today

- To learn about application software
- To become familiar with various software used in the following application areas:

e.g.

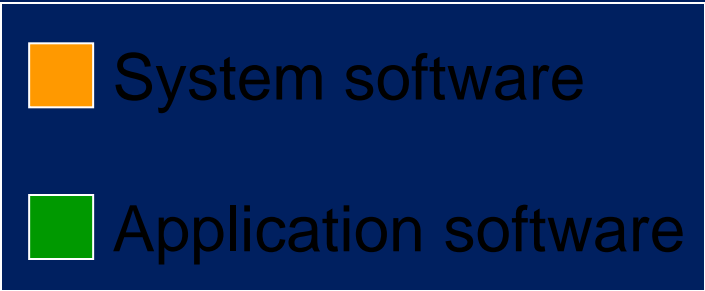
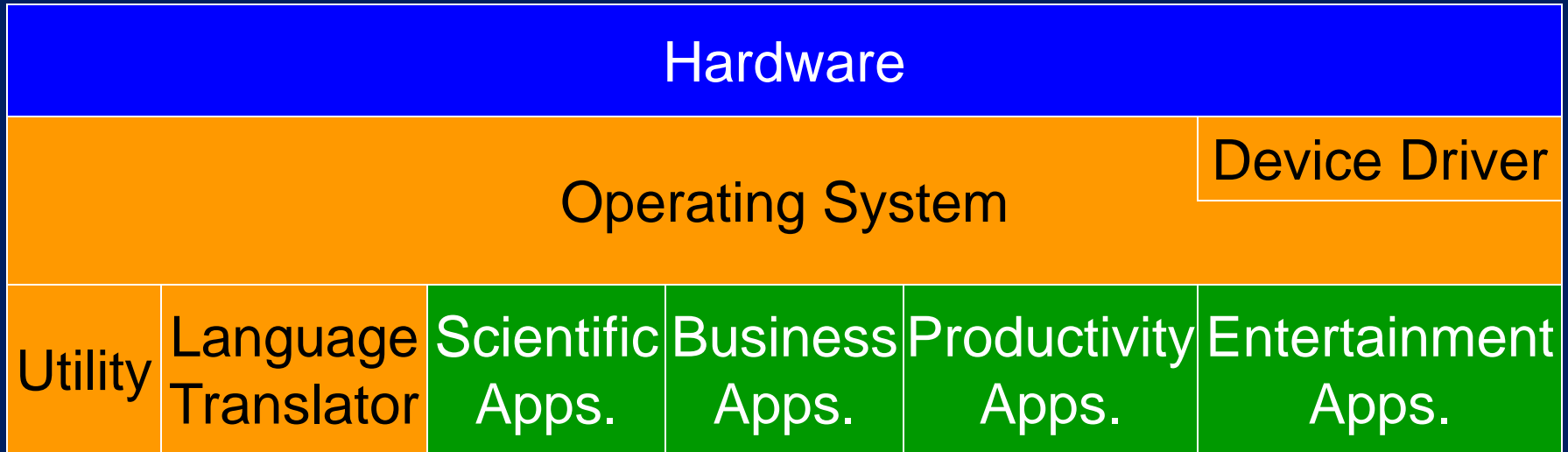
- Scientific/engineering/graphics
- Business
- Productivity
- Entertainment
- Educational



# Two Major Types of Software

- System Software
- Application Software





# Application Software

- Application software are programs that **interact directly with the user**
- They generally **do not talk directly to the hardware**



# Classification According to the Mode

- **Interactive-mode**
  - The user runs the program on the computer and **keeps on interacting** with the computer while the program runs
  - Example: Word processor
- **Batch-mode**
  - The user **starts the program** and the computer processes the provided data and produces results **without any further intervention** of from the user
  - Example: Payroll



# Classification According to Application Area

- Scientific/engineering/graphics
- Business
- Productivity
- Entertainment
- Educational





# Scientific/Engineering/Graphics Apps

- Key feature: **Intense floating**-point calculations
- **Scientific/engineering/mathematical** apps
  - Computers **initially** were designed just to run them
  - Generally designed for **specialists**
  - **Rudimentary UI's**
  - Many run in **batch** mode



# Scientific SW

- Simulation of **natural systems**
  - **Deforestation** and effect on green-house gases
- Simulation of **artificial systems**
  - **NeuralWare** (Simulator for artificial neural networks)
  - **Thermo-nuclear** explosions
- **Mathematical computation** packages
  - **Mathematica** (can do hundreds, if not thousands of functions, e.g. solving a differential eq, symbolically)
  - **MathCAD**



# Engineering SW

- Computer-aided design (**CAD**)
  - AutoCAD
  - SPICE
  - Virtual wind tunnels
- Computer-aided manufacturing (**CAM**)
- **Telecommunication** system SW
  - Centrex
- **Industrial control SW**



# Graphics & Animation SW (1)

Two types:



Moving  
graphics  
e.g. cartoons

## 1. Vector graphics

- Treats everything that is drawn as an **object**
- Objects **retain their identity** after they are drawn
- These **objects can later be easily** moved, stretched, duplicated, deleted, etc
- Are **resolution independent**
- Relatively small file **size**
- Example: **MS Visio, Corel Draw, Flash**

# Graphics & Animation SW (2)

## 2. Bit-mapped or raster graphics

- Treats everything that is drawn as a **bit-map**
- If an object is **drawn on top of another**, it is difficult to move just 1 of them while leaving the other untouched
- Changing the **resolution** often requires considerable **touch-up work**
- Relatively large file **size**
- Example: **MS Paint, Adobe Photoshop**



# Business Applications

- Most of the SW being developed today belongs to this category
- SW that is required to run most any sort of biz:
  - Payroll
  - General ledger
  - Order entry
  - Accounts receivable & accounts payable
  - Inventory control
- Let's now discuss a few business SW categories which are not that common, but are becoming more and more popular with time

# E-Commerce Software

- Key requirements:
  - Reliability
  - Security
  - Ability to handle 1000's of transactions, simultaneously



# ERP (Enterprise Resource Planning) SW

- Very **large scale, complex & expensive** SW
- **Ties together all key activities & major** systems of an organization into a **single** SW system
- Key benefit: **Optimization** of the business processes of an organization **as a single system** instead of many loosely-related stand-alone systems
- Example: **SAP, Oracle, PeopleSoft, Baan**





# DSS (Decision Support Systems) SW

- Sometimes also called “**expert systems**”
- Many times are based on a branch of computer science called “**artificial intelligence**”
- This category of SW is designed to help **business managers in making effective decisions in complex situations** based on the analysis of the **relevant data**



# Productivity SW

- Most **popular** category in terms of **licenses** sold
- Common features
  - Ability to **simplify, automate everyday** business tasks
  - Highly **interactive and user-friendly** design
  - Designed to run on **PC's**
  - Most users **do not use 90%** of the SW features
- Popular productivity SW
  - Word Processing
  - Presentations
  - Spreadsheets
  - Databases

# Word Processors

- Probably the **most popular** productivity app
- Initially designed as a **replacement for the typewriter**
- Automation
  - Automatic **end-of-line** soft carriage return
  - **Style sheets**
  - Table of **contents & index**
  - **Spelling & grammar** checking
- Two approaches: **WYSIWYG** (e.g. Word, WordPerfect, Star) or **traditional markup** (LaTeX)?
- **Desktop** publishing



# Web Page Development SW

- Web pages can be developed using a simple plain-text editor like the “notepad”, but more efficient, easy-to-use HTML editors can make the process quicker
- Some of them are WYSIWYG (i.e. you don't really need to know any HTML to use them), others are not, while some provide both types of interfaces (DreamWeaver)
- Most popular word processors now come with a built-in Web page development facility



# Spreadsheet SW (1)

- Electronic replacement for **ledgers**
- Is used for **automating engineering, scientific,** but in majority of cases, **business calculations**
- A spreadsheet - **VisiCalc** - was **the first popular** application on PC's.
- It helped in popularizing PC's by making the task of **financial-forecasting much simpler,** **allowing individuals** to do forecasts which previously were performed by a whole team of financial wizard



# Spreadsheet SW (2)

- Consist of **cells arranged in rows and columns**
- Each cell may contain **numeric** values, **text** or **formulas**
- Automation
  - **Recalculations**
  - **Charts**



# Presentation Development SW

- Used to prepare **multimedia material** for lectures & presentations to display key points, graphics, animation, or video with the help of multimedia **projectors**
- Have **replaced acetate** films (slides) that were used with **over-head** projectors
- Key **advantage over acetate** slides:
  - Easy to **modify**
  - Can be **sent electronically**
  - Its multimedia nature makes it more **interesting for the audience**



# Small-Scale Databases SW (1)

- **Easy to use** applications designed for **efficient storage** and **fast and easy retrieval** of data
- That data may be in the form of **numbers, text**, or even **multimedia**, i.e. sounds, graphics, animation, video





# Small-Scale Databases SW (2)

- Before the advent of the **currently popular “relational”** database model, the databasing function was performed using what is called the **“flat-file” model**
- That model is **not very efficient** for storing and searching in **large databases**
- A database consists of a **file or a set of files**. **Information** in these is stored in the form of **records**, and the records are further subdivided into **fields**



# Productivity SW Suites

- A **set of stand-alone** productivity applications designed to **work easily with each other**
- Share a **common UI**
- Are available as a **bundle** along with additional useful utilities
- Examples: MS **Office**, Corel **WordPerfect Office**, Lotus **SmartSuite**, **Star Office**
- **SW Suites for other app areas** are available as well, e.g. the Adobe suite of **graphics apps**

# Document-Centered Computing (DCC) - 1

- The **increasing cooperation** among the apps included in productivity suites has given rise to a **new computing paradigm** called DCC
- DCC implies that **instead of developing parts of a doc in a number of apps**, and then **cutting-&pasting** them to form the final doc, you **stay in a single doc** and **call-up appropriate apps** to **insert** the required objects



# Document-Centered Computing (DCC) - 2

- Let's say that we want to write a letter containing a **map**, a **table** and a **graph**
- We can:
  - **Launch the WP** and **type** the text in
  - **Insert a drawing** by calling up the **drawing toolbar app** (without leaving the WP) & **draw the map**
  - **Insert a table** by calling up the **spreadsheet app** (without leaving the WP) & **build the table**
  - **Insert a graph** based on that table using the same **spreadsheet app without leaving** the WP



# Entertainment SW

Key feature: **Simple, intuitive**, many times **social UI's**

- The user is generally **assumed to know nothing** about computers
- Both Microsoft & Apple are pursuing a **PC-as-a-personal-entertainment-hub strategy**. Probable result: Already popular entertainment SW will become **even more popular**



# Music & Video Players

- **Music players** (WinAmp)
- **Video/Music players** (Real player, Windows Media player, QuickTime player)
- The **Web Browsers** can also display video, animation, and play music with the help of **helper** applications like **Flash**



# Music Generation & Movie Editing SW

- A PC can be made the **hub of a music making studio** with help of appropriate HW & SW
- **Inexpensive, easy-to-use video editing SW** has recently become available for the iMac



# Games

- Many types
  - Educational (especially for toddlers)
  - Strategy/Simulation
  - Sports
  - Shoot'em ups
- The saddest aspect: You do not need any opponents or partners to play computer games
- The application SW category that provides the toughest challenge for computer HW





# Educational SW

- Category with probably the **highest growth rate**
- Current focus on **augmenting** traditional training and education methods, but it is shifting towards **replacing traditional methods**



# Electronic Encyclopedias

- Great resource of useful information presented in a very interesting format
- Superior to the paper-based version because:
  - Access speed is dramatically higher
  - Can contain animation and sound
  - Much lower cost as thousand's of pages in dozens of volumes have been replaced by a couple of CD's



# On-Line Learning

- With time, the **VU Web site will become** more and more **focused on interactive online** learning
- The **Website of our textbook** “Understanding Computers” is an example of an on-line learning Website
- Key features of **good online learning** SW:
  - The student can learn at his or her **own pace**
  - The student can select his or her **own hours**



# Interactive CD's

- **Same** as on-line learning, but through a CD instead of a Web site
- Key advantage:
  - Ideal for students with **slow Internet access**



# Attributes of Good Application Software

- Easy to **install, un-install**
- **User Interface**
  - **Consistent**
  - **Intuitive**
  - **Configurable**
  - **Adapts** to the users need
- Has a **tutorial** and a complete **help manual**
- Does not have any **critical bugs**



# Most Popular Application Software Categories

1. Web browsers
2. Email clients
3. Word processors



# What have we learnt today?

Application software are programs that **interact directly with the user** for the performance of a certain type of work

That work generally falls into one of the following **usage areas**

- Scientific/engineering/graphics
- Business
- Productivity
- Entertainment
- Educational



# Focus of the Next Lecture

- Next lecture will be the **first among the four lectures** that we plan to have on **productivity SW**
- That first lecture will be on **word processing**
- We'll learn about **what we mean by** word processing
- We'll discuss the **usage of various functions** provided by common word processors

