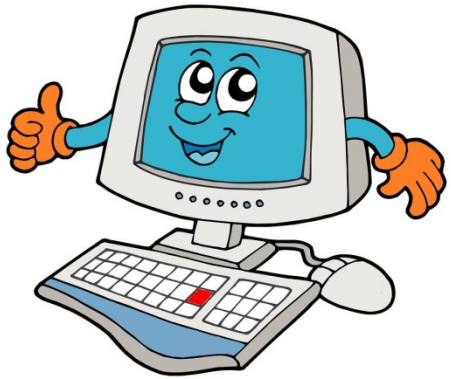
Principles of GUI Design and Programming

Contents

- HCI
- HCI History
- Usability

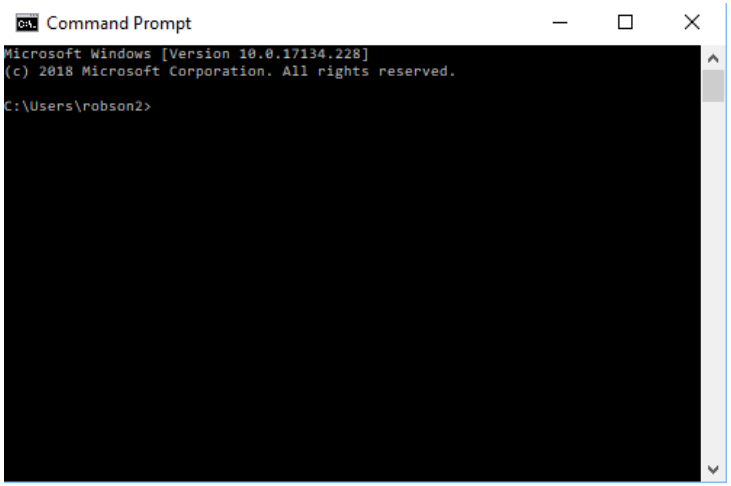
Human Computer Interaction

- Human Computer Interaction
  - Studies how humans interact with computers with the goal of improving the interface between humans and computers
  - Determine how to design interfaces that will make it
    - Easier to interact with computers
    - More intuitive to interact with computers
    - Reduce errors when interacting with computers



HCI – The Beginnings

- People interacted with computers command line interfaces
- Command line interfaces
  - Required that you learn a language
  - Required that you understand underlying computer concepts
  - Were not user friendly
  - Were often poorly documented

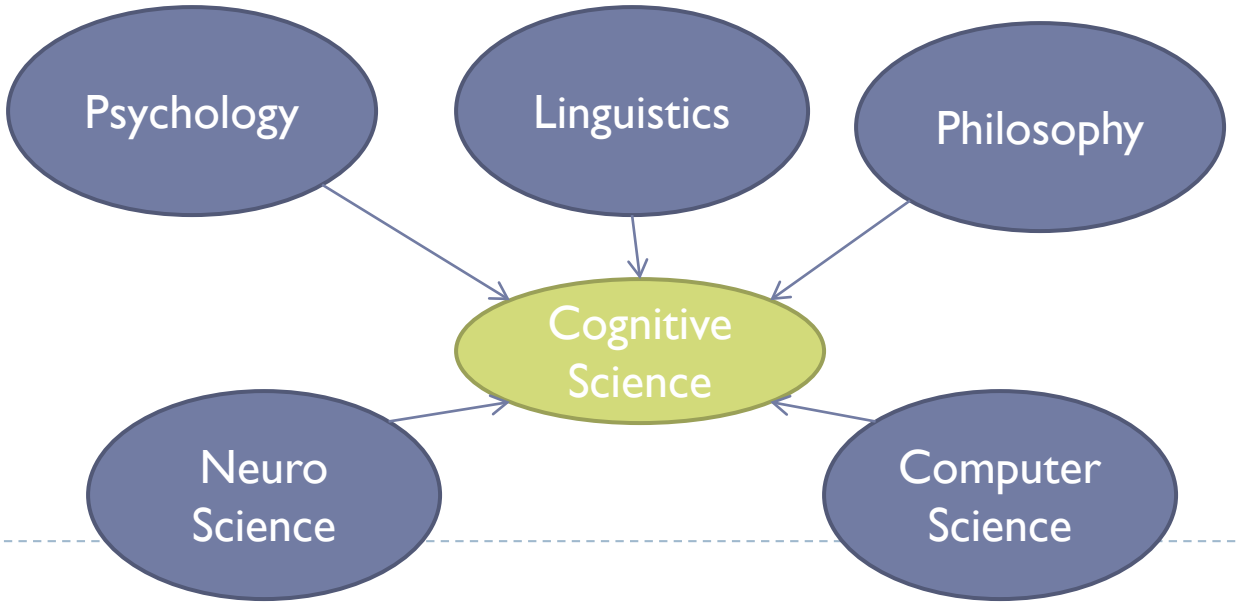


HCI – 1980

- In the beginning only professionals and dedicated hobbyists used computers
- This changed in 1980 with the introduction of the personal computer
- Suddenly,
  - Untrained people wanted to use computers
  - They did not want a long learning curve
  - They wanted to use computers as tools

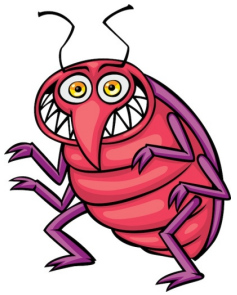
HCI – the 1980's

- At the same time that the general population wanted to use computers, there were advances in other fields like cognitive science and computer graphics



HCI – The Software Crisis

- The software crisis arose in the 1970's
- Software was
  - Overly complex
  - Bug ridden
  - Over budget
- This was another reason why we needed to produce software with better interfaces



HCI – the 1980's

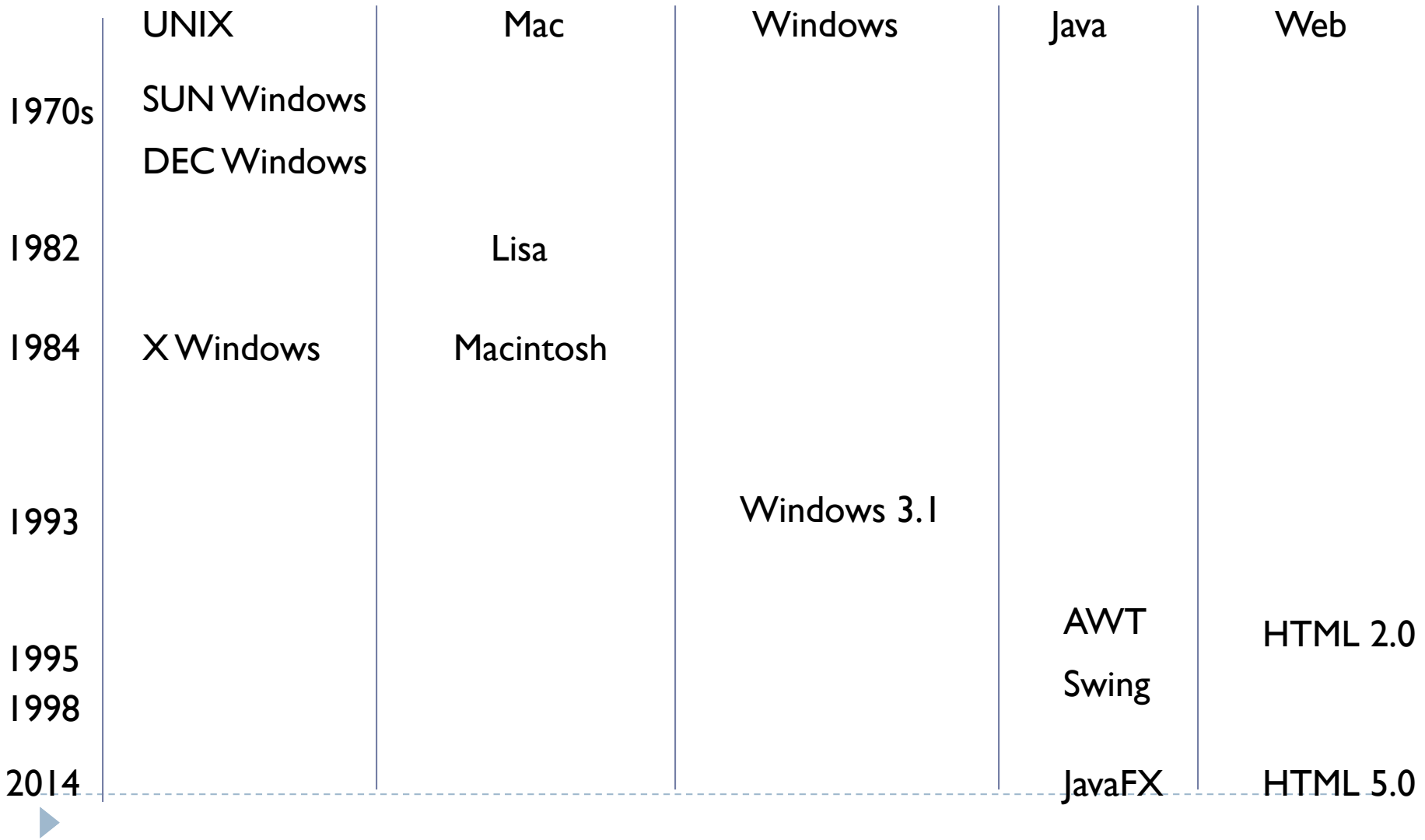
- HCI began as a branch of computer science
  - Focused on desktop applications
- It has spread to include
  - Documentation
  - Web applications
  - Mobile applications

HCI – Direct Manipulation

- Research at Xerox PARC led to
  - The mouse as a practical input device (1970's)
  - Direct manipulation interface (Xerox Star, 198

- There were rapid developments in hardware to support the increasing graphics requirements to support GUI's
- Workstations introduced software to develop GUI applications

GUI Software



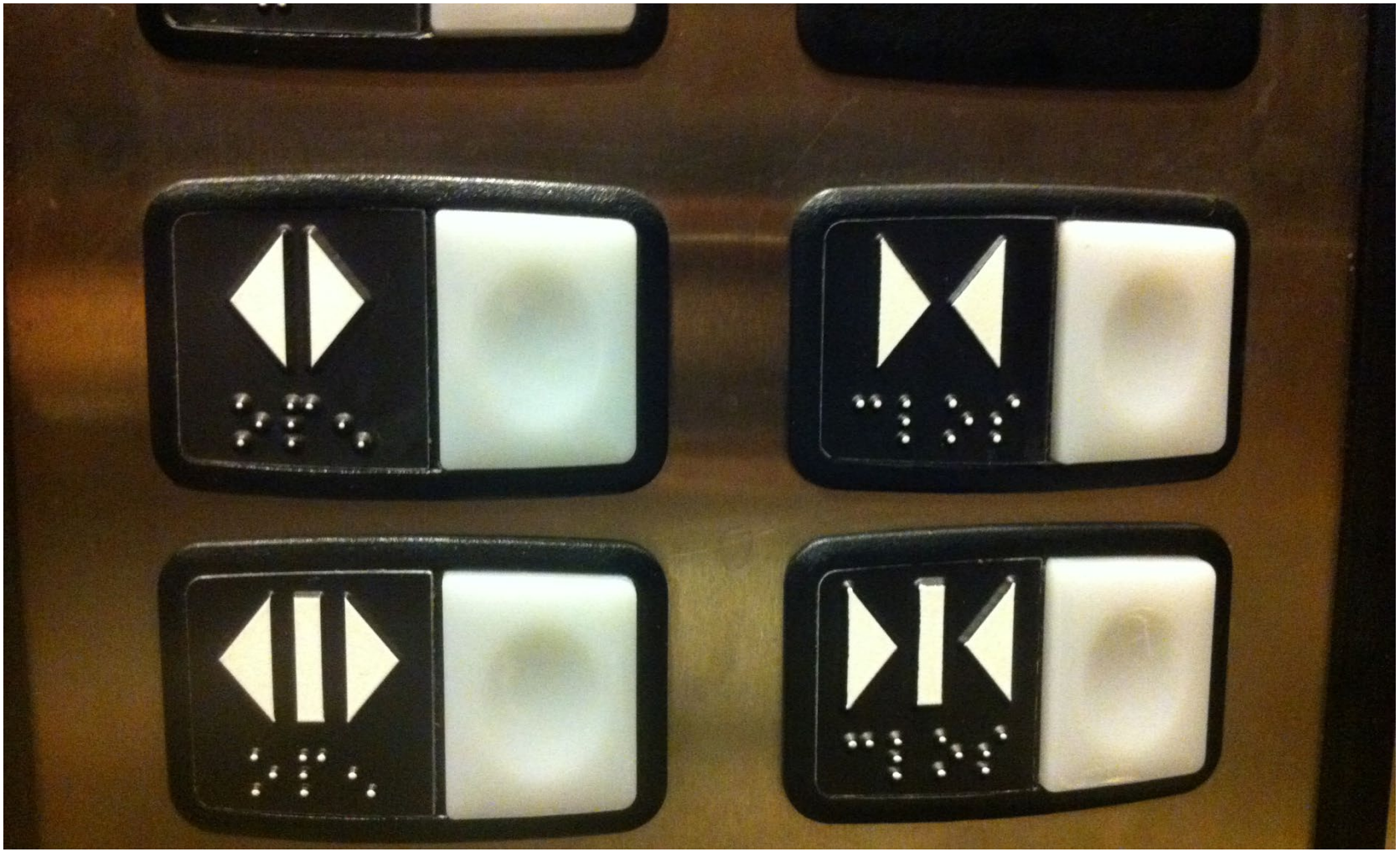
Consequences of Poor UI's

- Poor UI design leads to
  - Unintuitive software
  - Mistakes being made
  - No idea how to perform operations
  - Reduced productivity
  - Possible disasters

Poor UIs


UNDER-
STANDING
COMPUTERS
FOR
DUMMIES
UNDER-
STANDING
DUMMIES
FOR
COMPUTERS

Elevator Controls



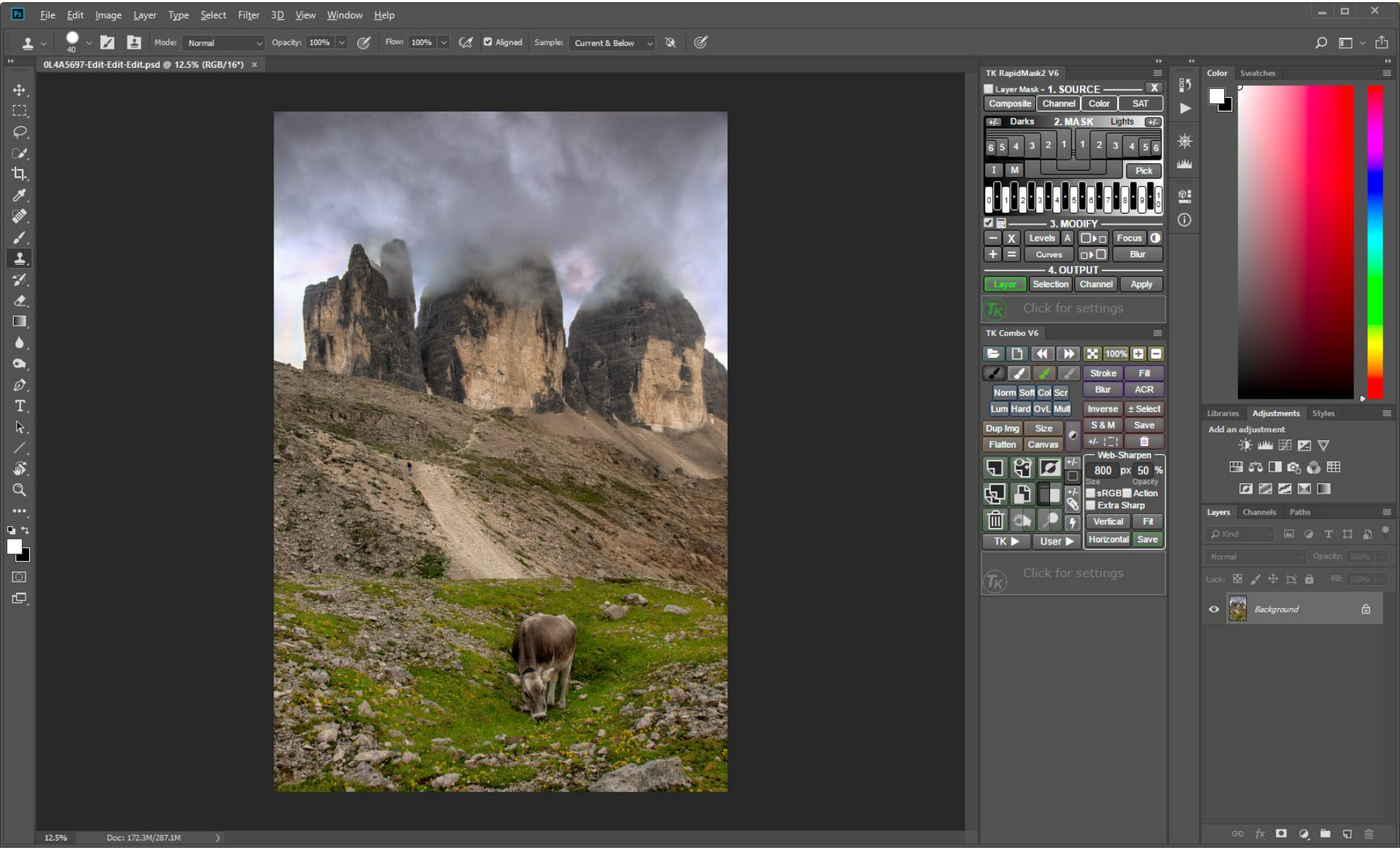
Adapting to technology

Example – MS Word Tables ('96)

- Internally, tables were represented as a tree of cells
- The editor allowed you to edit this tree
  - Made no sense until you realized you were editing a tree
  - Caused it to not perform like a table should
- Lotus AMI Pro had a table editor that performed like a table should
- Lotus had moved the UI from the programmer's space to the user's space

Example – Adobe Photoshop

- Presents the user with a set of image processing operations
- Most users have no idea how to use these operations to do something useful
- The result is a long, complex learning curve
- Nik Filters provide
  - Examples of images to start with
  - Operations familiar to photographers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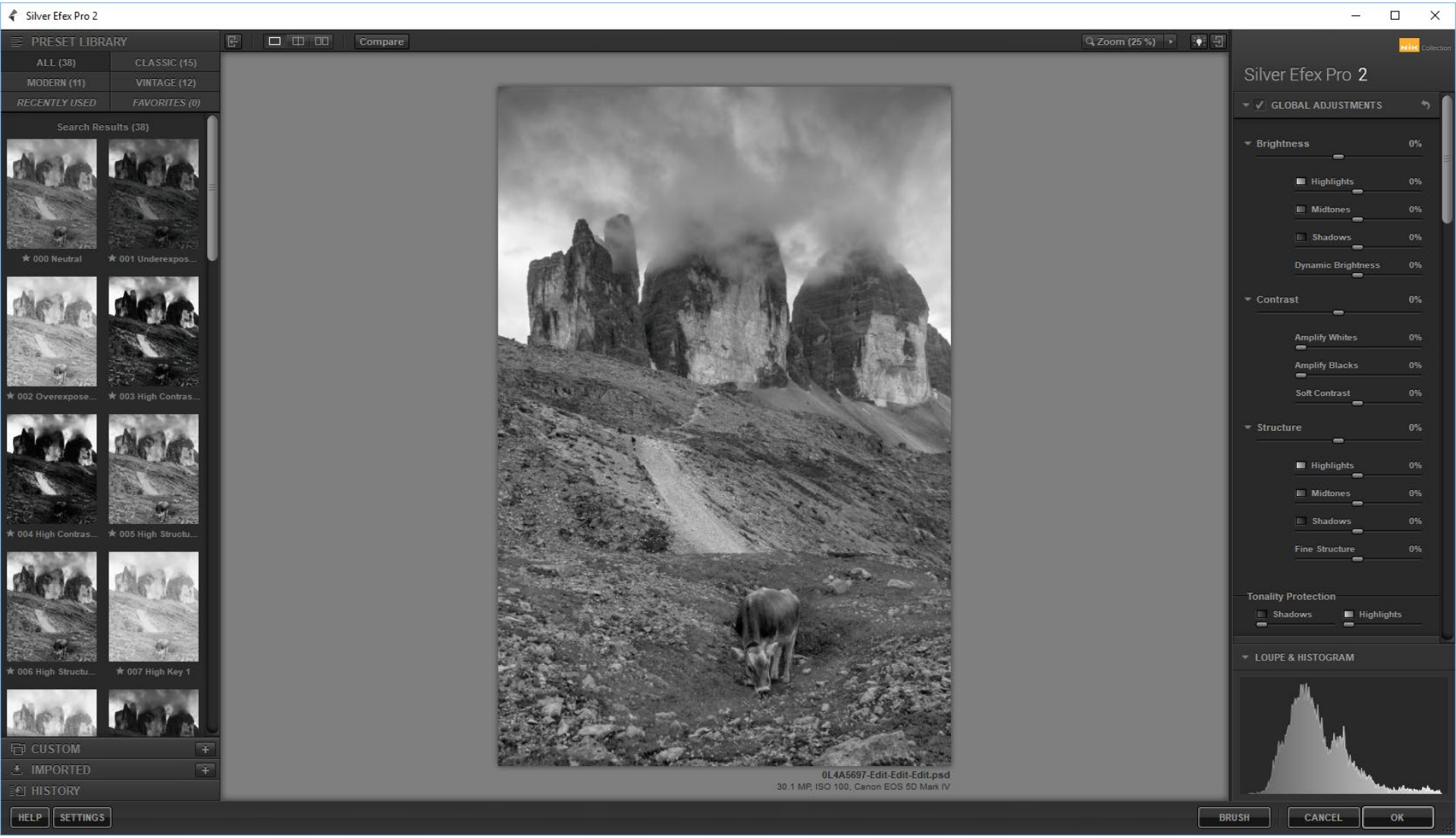
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Midtones 0%
Shadows 0%
Fine Structure 0%
Tonality Protection
Shadows
Highlights
LOUPE & HISTOGRAM
HELP
SETTINGS
BRUSH
CANCEL
OK

Usability

- Usability refers to
  - Software which is easy to learn
  - Software which is efficient to use
  - Software which results in the user having a satisfying experience

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Usability Goals

- Software which is intuitive and easy to learn
- Is efficient in performing tasks
- Is memorable so that they can return later and remember how to do things
- Reduces the errors made and provides a way to recover from them
- Reduces the load on the user's memory
- Provides a model of the system that is easy to understand
- Provides the user with a satisfying experience