Week 1: Introduction

DIGITAL ASSET DEVELOPMENT

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- Digital assets
- Fundamentals of digital data representation

Digital Asset Development

- Deals with the creation, manipulation and organisation of digital assets
- Output directed at computer animation and games development
- Will look at:
  - The technical issues related to digital assets
  - Manipulating assets using suitable software
  - Efficient storage (including file formats)
  - Strategies for organising assets

What Does This Mean?

- Software skills
  - Mainly Photoshop; Premiere; Audacity; UDK
- Theory
  - What you need to understand in order to get the most from the software
  - Techy stuff about formats, codecs, filters,...
  - Some creative tips and workflows
- Organising your projects efficiently and effectively

Why is this Useful?

- All aspects of animation and game production use digital assets
- These ideas should improve your own development projects
- Essential when working within a project team
- You will gain insight into the production pipelines for animation and games

Module Assessment

- All coursework-based
- Two assignments
  - First will be due around week 8
  - Second due in week 13 (after Xmas break)
- Both assignments will be development tasks related to lecture and lab topics
- More details of these will be posted in due course

Module Plan

- As this is the module's first run, the schedule is fairly "flexible"
- Roughly speaking:
  - Weeks 1-4: image manipulation (Photoshop)
  - Weeks 5-7: audio and video (Audacity / Premiere)
  - Weeks 9-10: putting it all together (UDK / Maya)
  - Time also for coursework completion

What is an Asset?

- The term asset refers to any component item that makes up part of a project
- Typically, assets can be prepared and edited outside the project environment
- Assets come in many types – these will depend on the nature of the project
  - There is a big overlap in assets used within the games and animation industries
  - Organisation of assets will depend on the software used

Assets for Animation

- In a (3D) animation project, the following are some typical asset types
  - Models
  - Image textures
  - Shaders
  - Rigged characters
  - Particle effects
  - Audio
  - Many others...

Assets for 3D Games

- For a typical console game, assets would include:
  - Models (characters, props, environmental)
  - Textures
  - Animations
  - Sounds
  - 2D graphics (eg .for HUD)
  - Effects
  - **Code**
  - Others...

Assets for 2D Games

- For a typical 2D game (mobile / web), assets would include:
  - 2D graphics (character avatars; backdrops; other game elements)
  - Animations
  - Sounds
  - Code
- In all cases, the developer will combine the assets into an end product

Digital Assets

- All the types of assets listed on previous slides are digital in nature
  - Consist of combinations of 1s and 0s
  - This may seem obvious, but it is vital for our ability to combine assets in such ways
- Understanding digital representation is essential to this module
- It has implications for how we create, edit, store and distribute content

Example: Photography

- A good field for exploring the impact of digital technology is photography
- For over a century, all photography used analogue technology
  - Ancient history for most of you!
  - Images captured via photographic film
  - Film was coated with silver halide
  - Chemical reaction caused by exposure to light produced an image on the film

Photographic Film

- The stored image would not be viewed directly
  - Film had to be chemically developed (not a trivial process)
- Copies for viewing would be made as:
  - Photographic prints
  - Slides (for projection onto a screen)
- Typically a roll of film could hold 24 or 36 photographs

Digital Photography

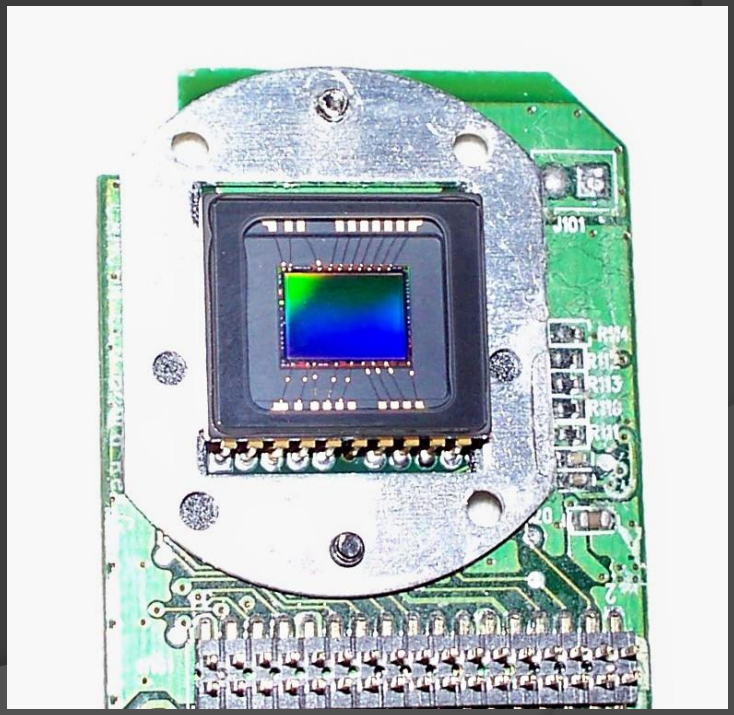
- Modern cameras overwhelmingly are digital in nature
- Most cameras capture images using CCD technology
  - Charge coupled device
- This consists of a grid of sensor cells
  - Each cell directly converts incoming light into an electrical signal
  - Signal strength corresponds to light intensity

Reading the CCD

- The signal from each sensor cell in the CCD is converted to a digital number
  - This takes place in the electronics around the sensor array
- The collection of numbers across the whole grid defines the digital image
- This is then stored in camera memory or on an external card for future display

photographic film

CCD for digital camera



Comparing Technologies

- CCD has many obvious advantages
  - Film has very limited capacity
  - Image capture on film is an irreversible process – can't delete an image
  - Film is expensive
  - Developing film is a complex process
  - Film can easily be damaged
  - Digital photos can be copied, edited, viewed and transmitted with minimal effort

Issues with Digital Photos

- Digital technology is clearly superior for almost all photography
- The earlier description skipped over a couple of key points
  - How does the conversion of the CCD output to digital numbers work?
  - How is the resulting digital photo actually stored?
  - These are questions of digital representation

Digital Sampling

- The process of converting an electric signal to a number is called sampling
- The signal can have any value within the sensor's dynamic range
- The sampling process divides up this range into segments, and assigns a number to each
- More segments implies a better sample quality

Digital Representation

- The numbers may be “packaged” in various ways for storage
- The representation of the data defines the format of the image
  - Some representations work better than others for a given situation
  - Some allow you to compress the data so it takes up less memory/bandwidth
  - The trick is to do this without losing quality

Digital Data in General

- Digital photography is just one example of digital data production
- All scenarios where data is captured in digital form follow similar principles
  - Data is sampled from some form of signal (usually in electrical form)
  - The sampling process generates a set of digital numbers
  - These numbers can be stored in various formats