

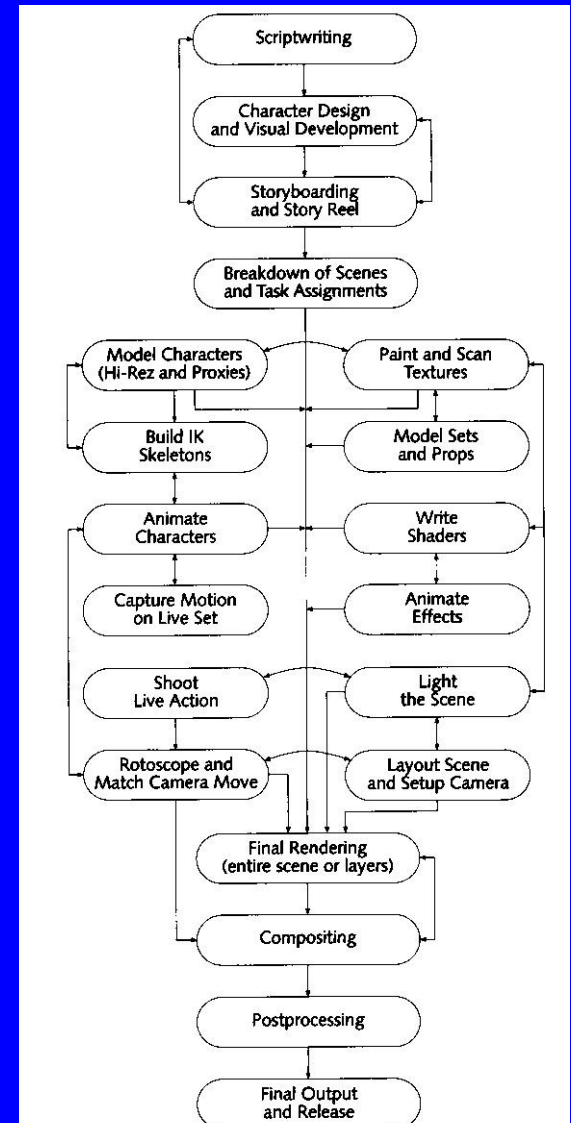


Intro to Animation

- Overview of CG Animation Production Process
- Overview of Different Tasks in CG Anim.
- Maya Terminology
- Introduction to the Maya Interface
- Overview of Maya's Internal Architecture

Digital Production Pipeline

- Story
 - Visual Development
 - Character Design
 - Storyboards
 - Scene Layout
-
- Modeling
 - Animation
 - Shading and Texturing
 - Lighting
 - Rendering
 - Post Production



Story

- Different types of stories
 - beginning/middle/end with conflict and resolution (drama)

- Red's Dream
 - Mickey Mouse
- String of Gags
 - Roadrunner
- Story is the most important part of any animation
 - 1 big, simple idea
 - the story you can tell in 2 sentences
 - Shorts are particularly hard to get right



Visual Development

- What look will your scenes have?
- Who are the characters and how do they look?
- Develop style
- Includes the creation of characters, environments (desert, swamp), props, etc.
- Involves painters, sculptors, illustrators, etc.
- Lots of drawings pasted up on the wall!



Character Design

- After story come characters
- Consists mostly of drawings, or sculptures
 - body poses
 - facial expressions
 - key features from multiple points of view
- Note the lack of computers at this stage!



COLOR:

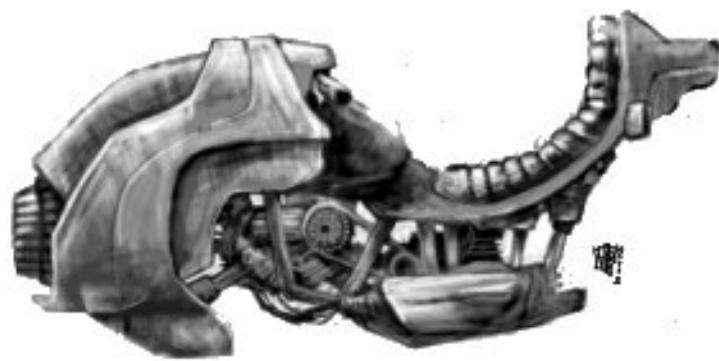
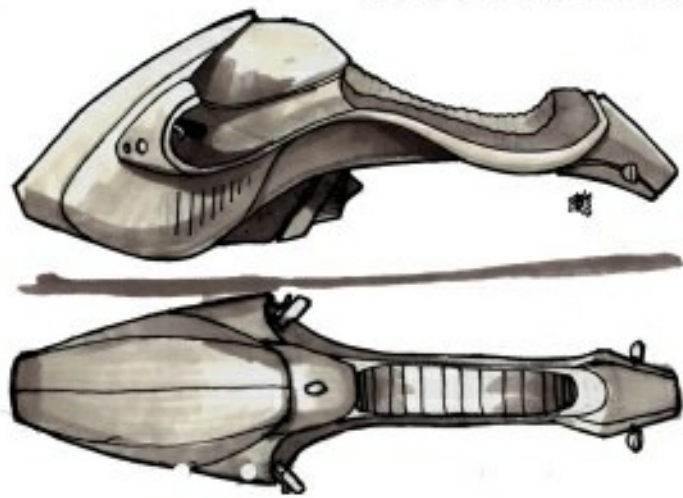


SIDE

BULLET



COLOR:

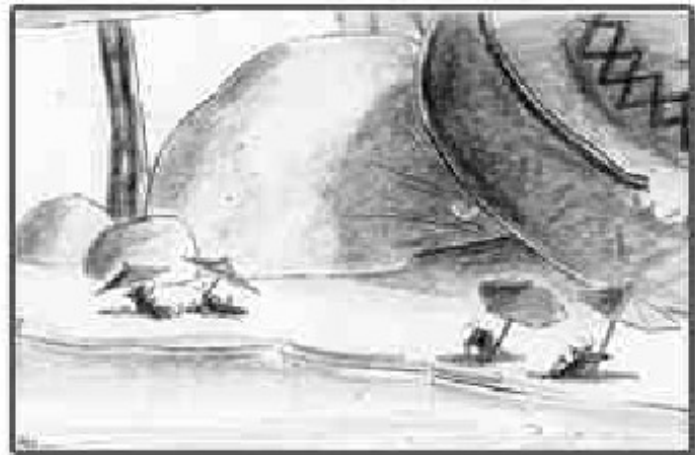


Storyboards

- The film in outline form
 - specify the key scenes
 - specify the camera moves and edits
 - specify character gross motion
- Typically paper and pencil sketches on individual
- Sheets taped on a wall
- Still not very many computers...



Story Boarding (from “A Bug’s Life”)



☐ Sc. 3 CONT'D²⁵ ☐ Sc. 4☐ Sc. CONT'D (19)BARNEY (OS): LH-OH!

SFX: (SLIDE WHISTLE)



SFX: (KLONK!)

SFX: (CRACKLE!)

☐ Sc. CONT'D PART ANIMATED TRUCK IN☐ Sc. CONT'D X-DISS ON NEUTRAL BG ANIMATED TRUCK IN☐ Sc. CONT'D (MORE) →

SFX: (POP!)

SFX: (TWINKLE!)

FRED: HEY!

JEWELS



INSIDE TREE HOUSE - MONKEY
HOLDS BOOK AS HE JUMPS UP & DOWN.



C.U. OF BOOK
ANNCE: IT'S SUPER SAFARI -
AN ADVENTURE IN COLLECTING
ANIMALS OF THE WORLD. . . .



MONKEY JUMPS OUT OF SCENE
ANNCE: JOIN ANIMAL HUNT...
BRING 'EM BACK TO LIFE HERE
SURROUNDINGS... EATING BE...
... YOU COMPLETE...



C.U. AS KID OPENS BOOK - PAGE
SHOWS ART AND TEXT.
ANNCE: ... FULL OF INTERESTING
INFORMATION. . . .



KID HOLDS UP BOOK + PACKET #1
SUPER TYPE.
ANNCE: ... HERE! ALL YOU DO --
GET 55 BOOK FREE -- PURCHASE
#1 AT SUPERMARKET --



REPEAT STAMPEDE SCENE - TRUCK IN ON ONE ANIMAL
ANNCE: EIGHT DIFFERENT ANIMALS IN EACH PACKET. . . .



ANIMAL INTO FREEZE FRAME - STAMP
FACES IN AROUND HIM - X-DIES
FROM ANIMATION ART TO ILLUSTRATED
DRAWING



KID'S HANDS - PEELS ANIMAL
OFF STAMP
ANNCE: YOU - PEEL THEM OFF -
STICK IN PLACE IN BOOK --



KID'S HAND PASSES ANIMAL IN
PLACE ON PAGE - TRUCK BACK
TO REPEAT SCENE ON PAGE.



KID RUNS OUT OF TREE HOUSE
ANNCE: ... THEN GO BACK TO ...



KID JUMPS ON RHINO AS IT RUNS
ON PAN
ANNCE: ... THE --- SUPERMARKET

What makes a good storyboard?

- Does the shot sequence
 - maintain continuity
 - not confuse the audience
 - contain variations in pacing
- Is the information clearly presented?
- Are the characters clearly portrayed?
- Is the story clear?
- Do you have the techniques necessary to pull it off?
- Can you do it with the time and £ you have?

Scene Layout

- Design the scenes
- for example, build the room with an understanding of the camera pan
- create colors, textures, props
- keep in mind camera and character motion within the scene
- use placeholder geometry and start to design camera moves



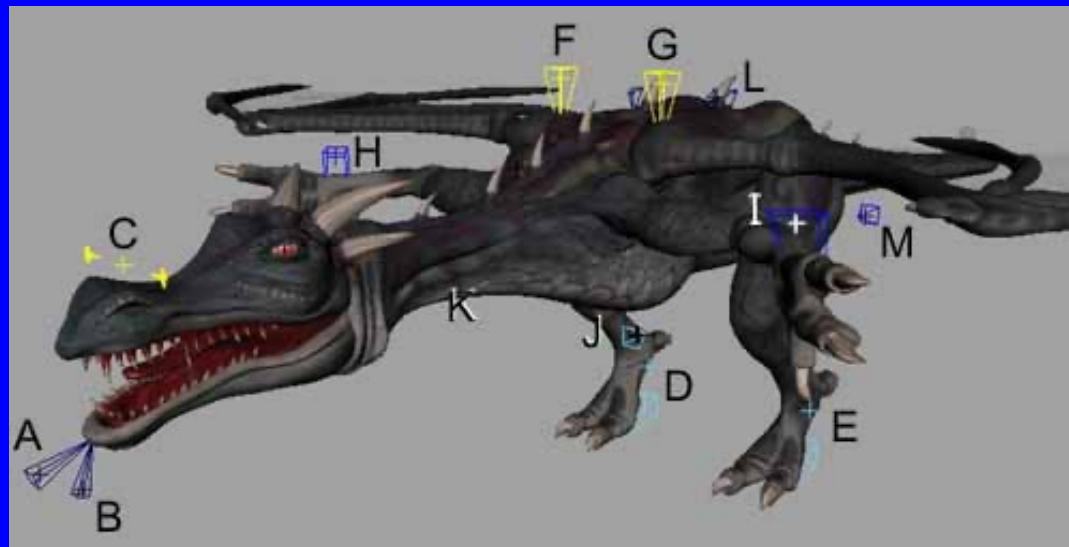
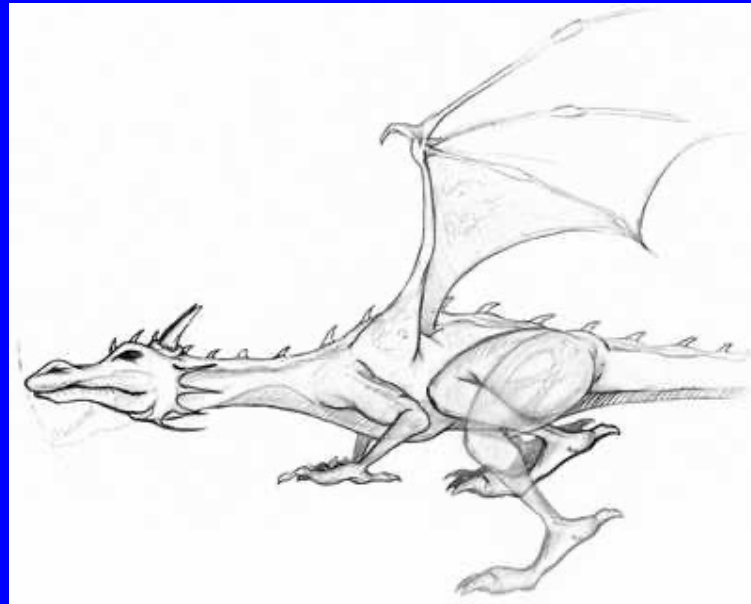
Digital Production Pipeline

- Story
 - Visual Development
 - Character Design
 - Storyboards
 - Scene Layout
- Modeling
 - Animating
 - Shading and Texturing
 - Lighting
 - Rendering
 - Post Production

Modeling

- Create geometric models of environment, props, characters
- Keep in mind the ultimate purpose of the model – feature film, game, etc.
- Set up internal skeleton and animation handles appropriately for that character's behaviors







Rendering

- Frames can take hours to render
- 1800 frames for a single minute of animation
- Pixar has a HUGE renderfarm



Post Production

- Sound track sync
- Titles
- Cuts and effects (dissolves, fades, etc)

Production Team (Effects-Oriented Feature Film)

Visual Effects Group

Visual Effects Producer
Visual Effects Director
Visual Effects Supervisor or
Assistant Director
Visual Effects Editor
Visual Effects Assistant Editor
Visual Effects Coordinator
Stage Technicians

Computer Animation Group

Computer Animation
Supervisor
Computer Animation Shot
Supervisors
Computer Animators
Computer Animation
Production Coordinator

Computer Technical Support Group

Computer Graphics (CG)
Department Manager
CG Software Developers
CG Technical Assistants
CG Systems Support

Digital Compositing and Postproduction Group

Digital Supervisor
Digital Artists
Compositors
Digital Transfer Operator
Digital Coordinator
Scanning Supervisor
Scanning Operators
Scanning Software
Rotoscoping Supervisor
Rotoscopers
Plate Photography
Coordinator
Optical Photography
Supervisor
Plate Photographers
Effect Photographers
Negative Cutter

Creative Team (Effects-Oriented Feature Film)

Director
Scriptwriter
Production Designer
Visual Effects Director
Art Director
Storyboard Artist
Producer

Administrative Team (Effects-Oriented Feature Film)

Executive Producer
Production Assistant
Production Manager
Director of Postproduction
Director of Finance
Production Accountant

A Bug's Life

Animation.....61
Animation Manager.....1
Animators.....33
Assoc. Animation Manager.....1
Additional Animation.....23
Fix Animator/Coordinator.....1
Production Assistants.....2

Lighting Team.....40
Lighting Manager.....1
Lighting Artists.....38
Lighting Coordinator.....1

Information Systems.....33
Director.....1
Managers.....2
Sys. Admins. and Support.....30

Modeling Team.....31
Modeling and Shading Mgr. 1
Modeling Artists.....30

Add. Software Dev.....30
Director.....1
Software Engineers.....26
Documentation and Support.....3

Crowd and Effects Team.....27
Crowd Technical Supervisor.....1
Effects and Crowd Mgrs.....2
Effects Technical Artists.....13
Crowd Technical Artists.....7
Add. Crowd Tech. Support.....3
Crowds and Effects Coord. 1

Art.....26
Art Department Manager.....1
Shading Design.....1
Lead CG Painter.....1
CG Painters.....3
Sketch Artists.....6
Sculptors.....2
Character Design.....1
Additional Character Design.....7
Visual Development.....1
Art Development Coord.....1
Art Department Prod. Asst.....2

Post Production.....26
Post Production Supervisor.....1
Post Production Consultant.....1

Post Production Assistant.....1
Recording Mixers.....2
Original Dialogue Mixer.....1
Supervising Sound Editor.....1
ADR Editor.....1
Sound Effects Editor.....1
Foley Editors.....2
Assistant Sound Designer.....1
Assistant Sound Editor.....1
Foley Artists.....2
Foley Mixer.....1
Foley Recordist.....1
Effects Assistant.....1
ADR Assistant.....1
Mix Technicians.....2
Add. Dialogue Recording.....4
Add. ADR Voice Casting.....1

Executive/Supervising Team.....23
Director.....1
Co-Director.....1
Producers.....2
Screenplay.....3
Story Supervisor.....1
Supervising Film Editor.....1
Supervising Technical Directors.....2
Director of Photography.....1
Production Designer.....1
Art Directors.....2
Supervising Animators.....2
Shading Supervisor.....1
Supervising Layout Artist.....1
Production Manager.....1
Production Supervisors.....3

Editorial.....22
Second Editor.....1
First Assistant Editor.....1
Second Assistant Editors.....4
Editorial Coordinator.....1
Film Coordinator.....1
Production Assistant.....1
Temporary Music Editor.....1
Temporary Sound Editors.....2
Add. Second Asst. Editors.....6
Additional Editing.....4

Production.....21
Scheduling Coordinator.....1
Production Accountant.....1
Disney Prod. Representative.....1
Asst. Prod. Accountants.....2
Executive Asst. to Directors.....1

Executive Asst. to Producers.....1
Production Office Coordinator.....1
Production Asst. to Directors.....1
Production Assistants.....3
Production Interns.....7
Add. Production Support.....2

Layout.....19
Layout Manager.....1
Senior Layout Artist.....1
Layout Artists.....9
Lead Set Dresser.....1
Set Dressers.....2
Additional Set Dressing.....4
Layout Coordinator.....1

Rendering Software Dev.....19
Director.....1
Special Rendering Techniques.....3
Production Support.....2
Software Engineers.....13

Shading Team.....19
Shading Artists.....17
Modeling and Shad. Coord.....2

Story Team.....19
Story Manager.....1
Story Artists.....10
Additional Storyboarding.....6
Production Assistants.....2

Camera.....12
Camera Manager.....1
Photoscience Manager.....1
Camera Supervisor.....1
Camera Software and Eng.....3
Camera Technicians.....3
Color Science Engineers.....2
Department Administrator.....1

Rendering Team.....12
Lead Render Tech. Director.....1
Rendering Manager.....1
Render Tech. Directors.....9
Optimization Consultant.....1

Crowd Animation Team.....7
Crowd Animation Supervisor.....1
Crowd Animation.....6

Costs:

Lilo and Stitch \$80 Million

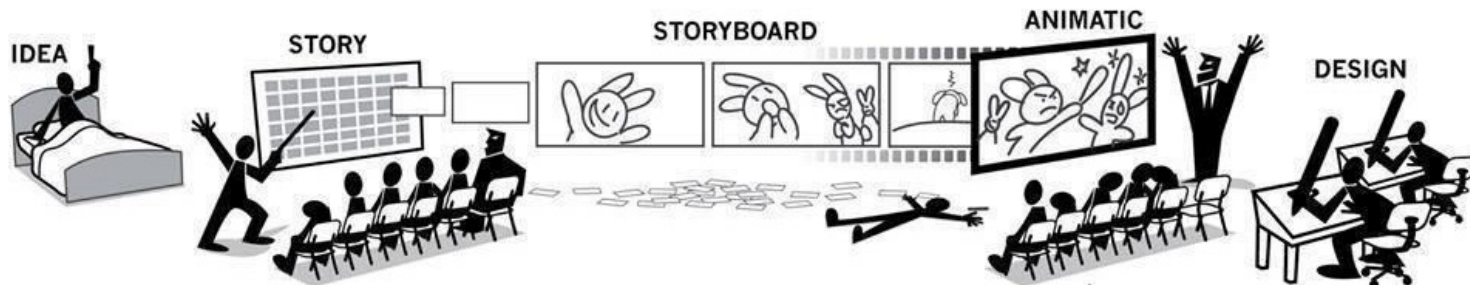
Spirited Away \$20 Million

Pirates of the Caribbean \$140 Million

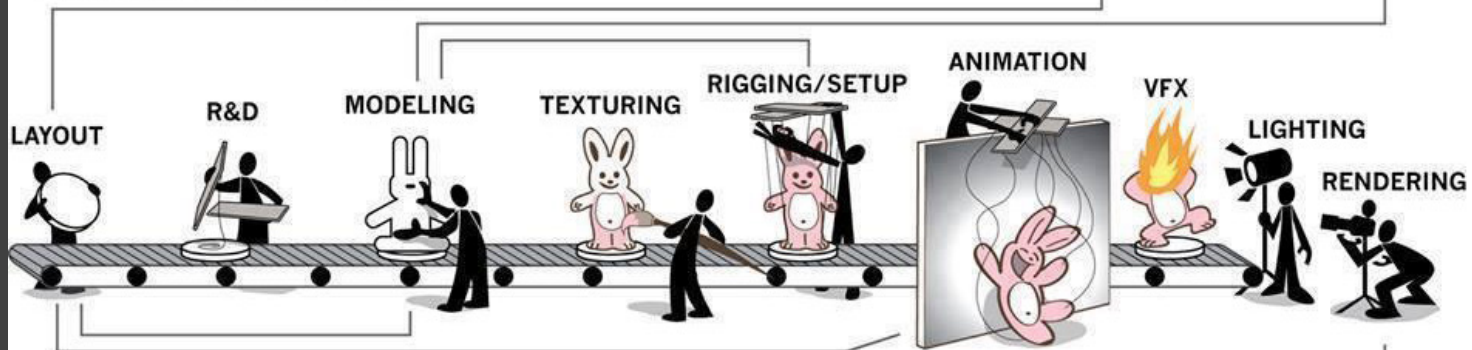
Walking Tall \$46 Million

Production Pipeline

PRE-PRODUCTION



PRODUCTION



POST-PRODUCTION

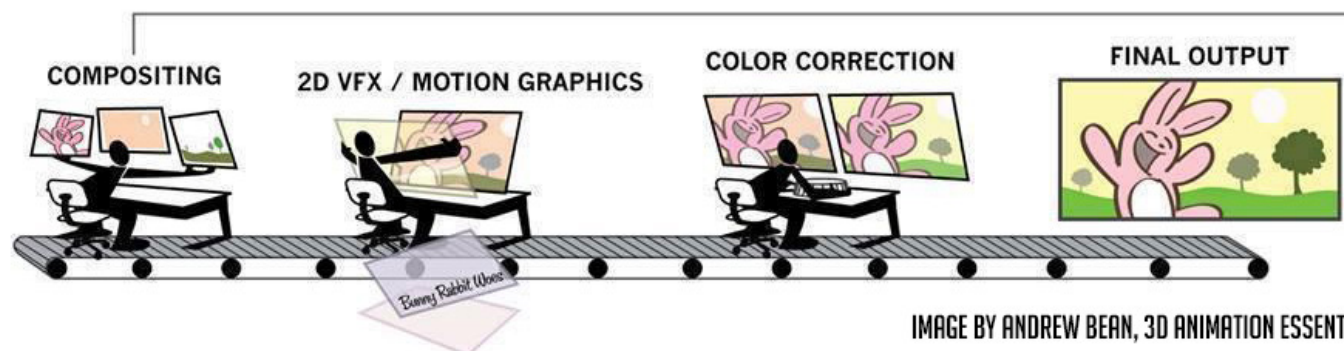


IMAGE BY ANDREW BEAN, 3D ANIMATION ESSENTIALS (2012)

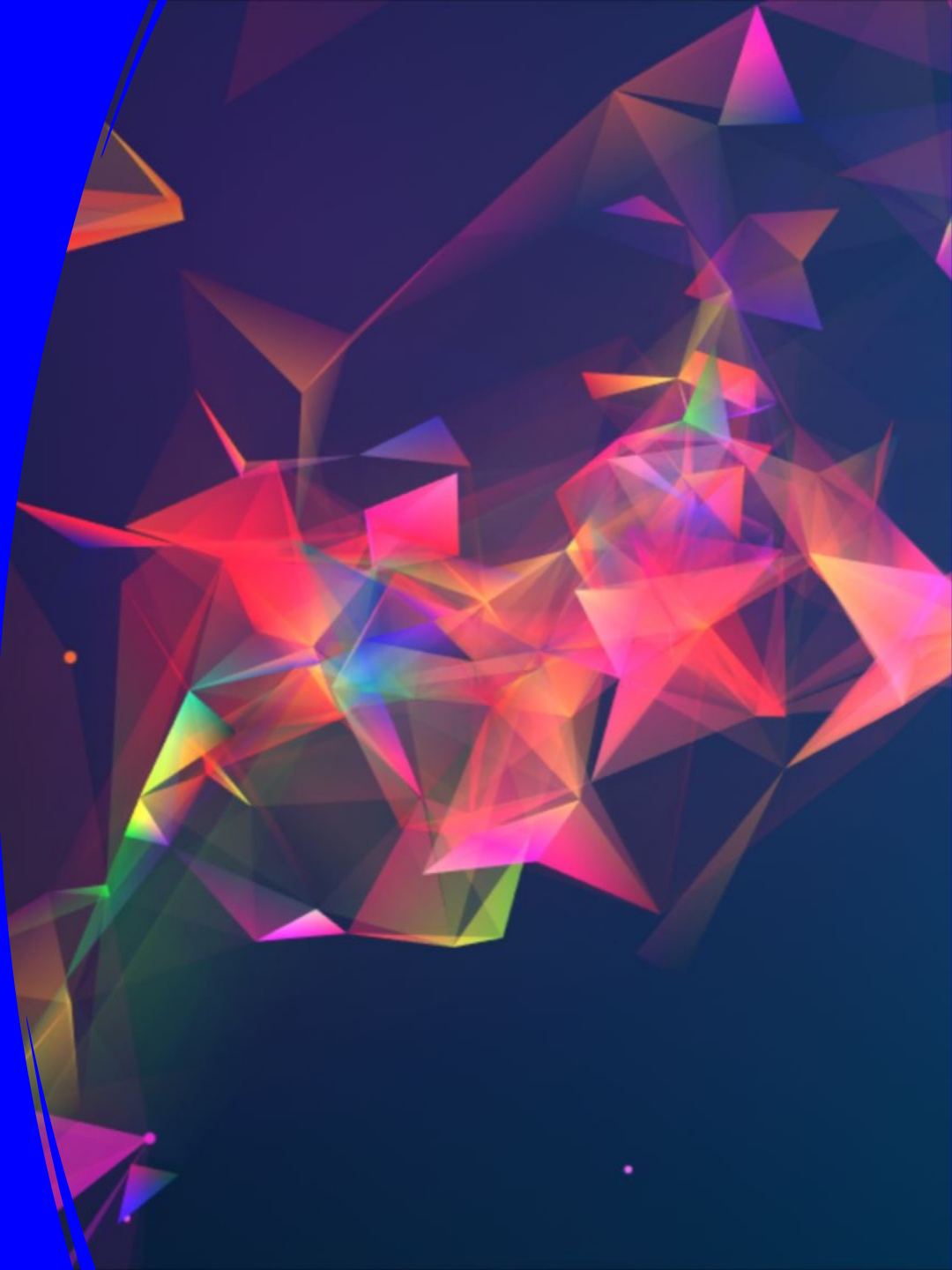
Computer Graphics Animation Jobs

- Character Animators
- Effects/Prop Animtors
- Modelers
- Lighting Artists
- Technical Directors – the interface to technology.



Long List of CG Jobs

- **Character animators**
- **Effects animators**
- **Modelers**
- **Lighting artists**
- **Compositors**
- **Motion Technical Directors**
- **Modeling Technical Directors**
- **Look Development Technical Directors**
- **Look Development Artists**
- **Production Software Technical Directors**



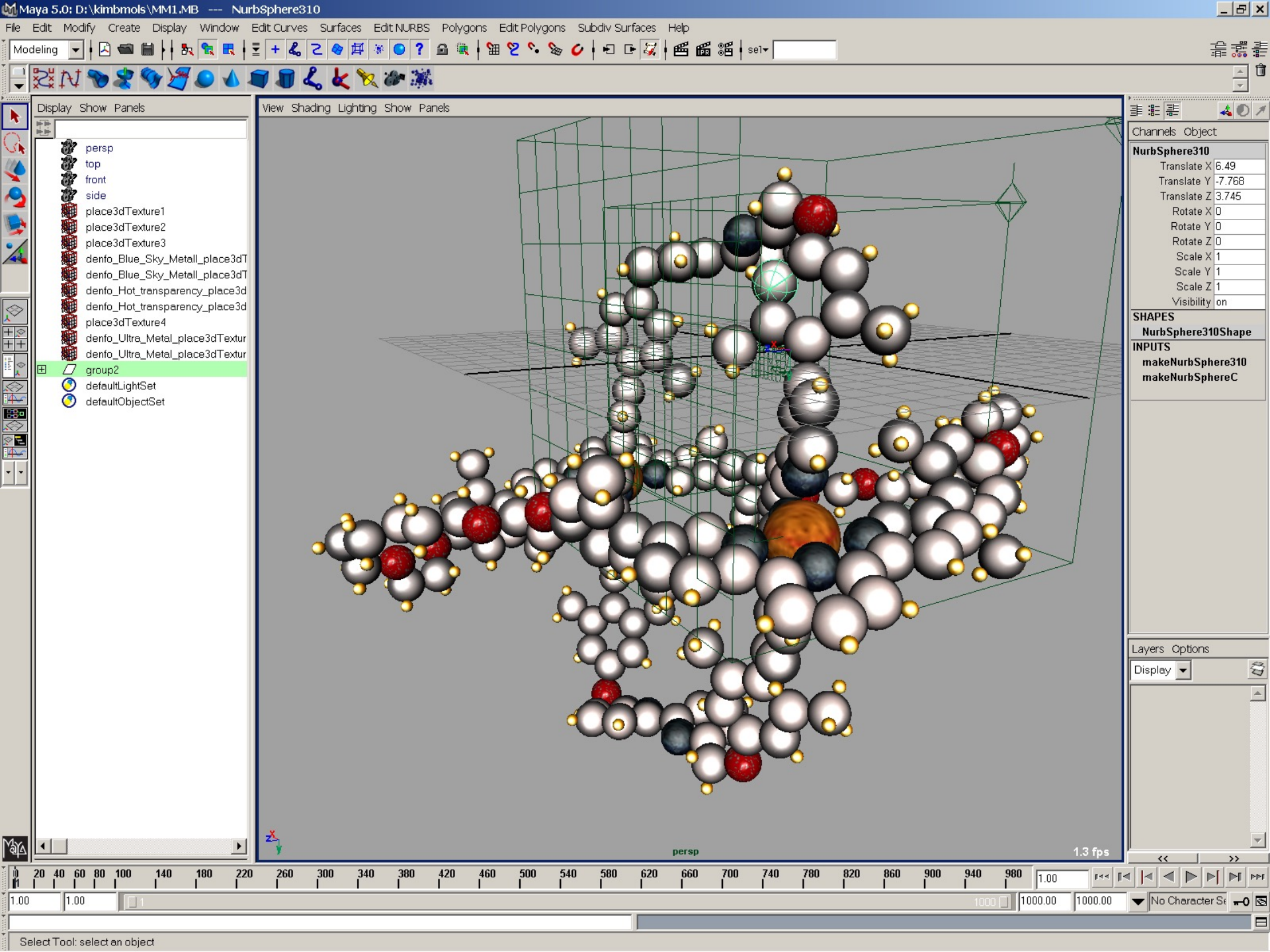
Critical CG Activities

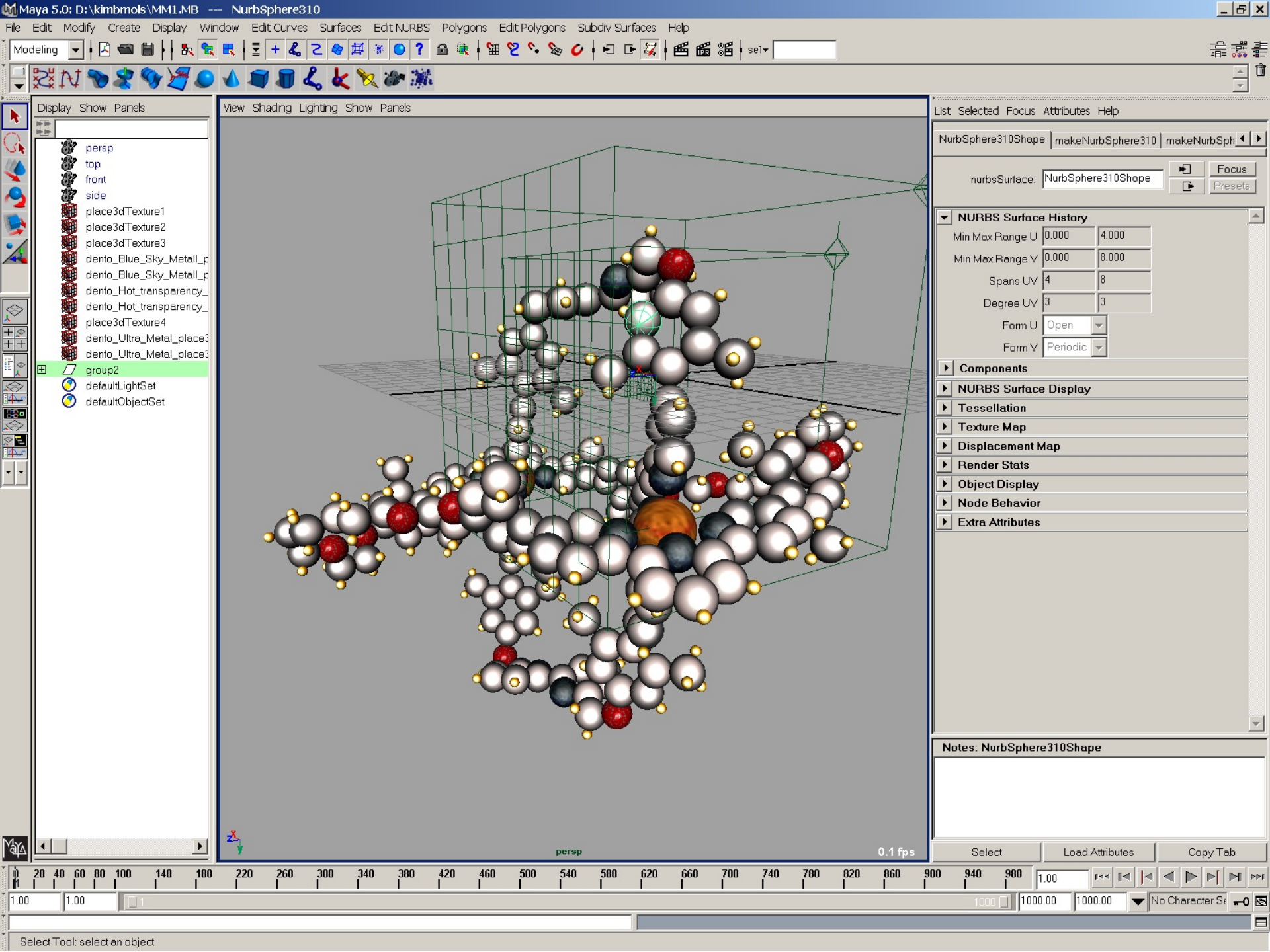
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- Animation
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- Lighting
- Rendering

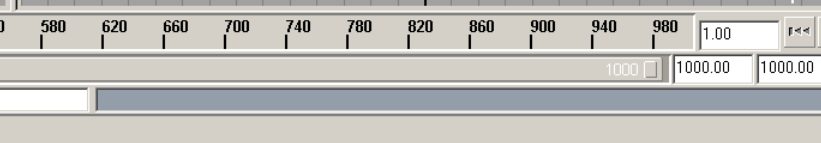
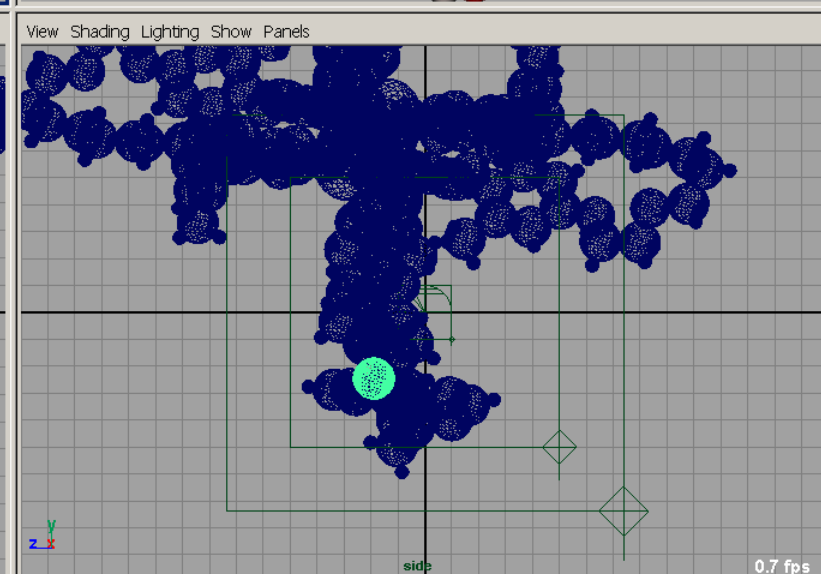
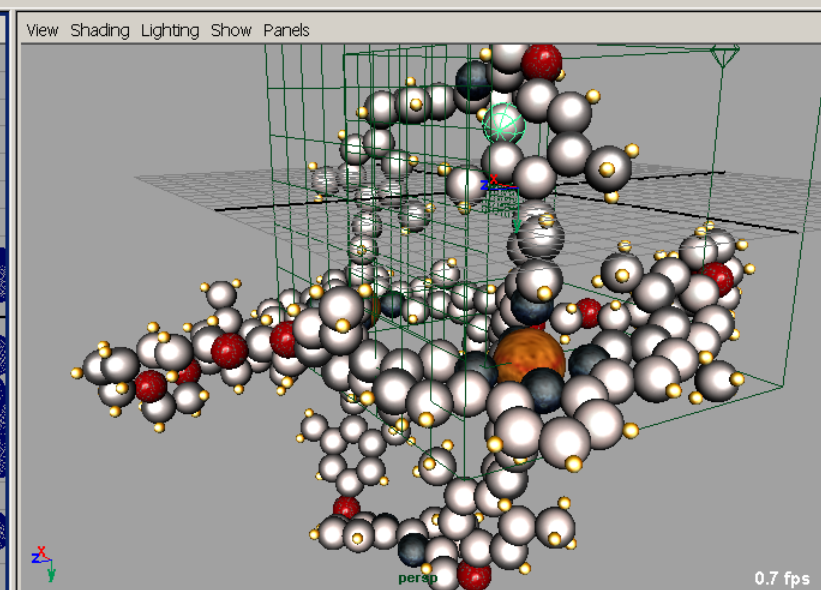
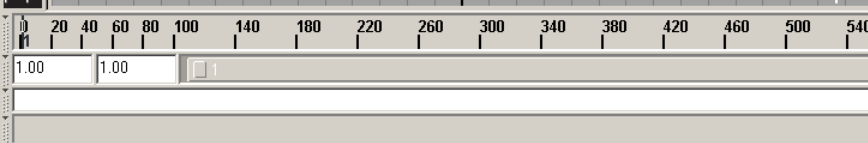
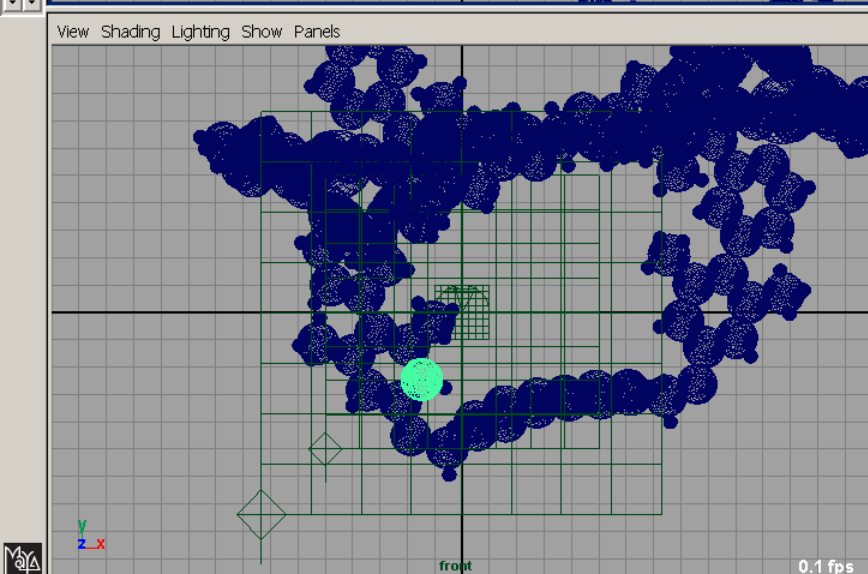
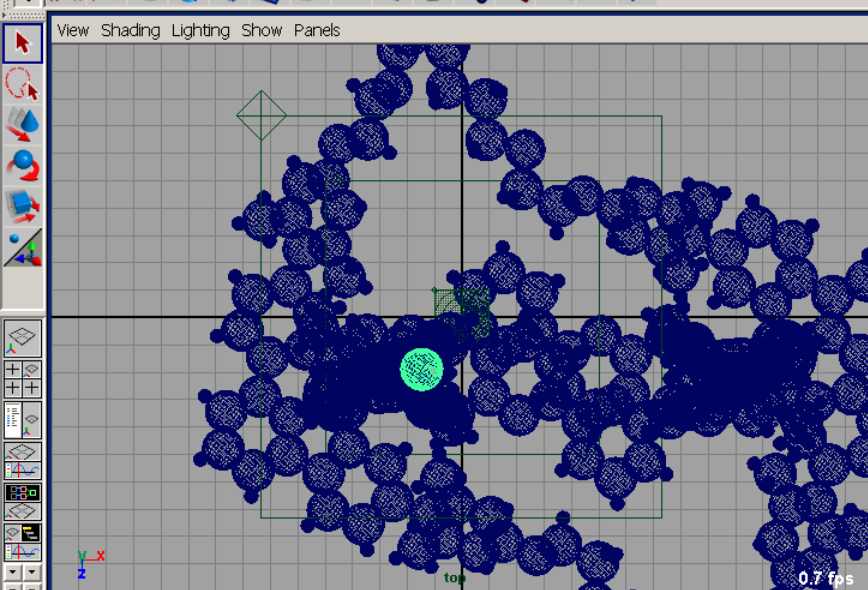


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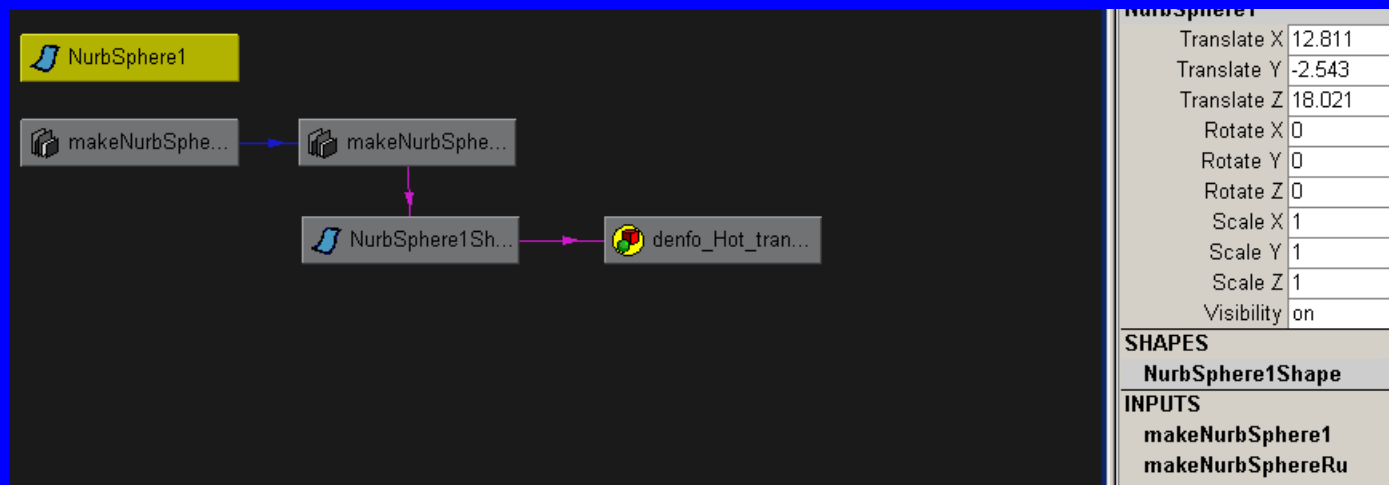
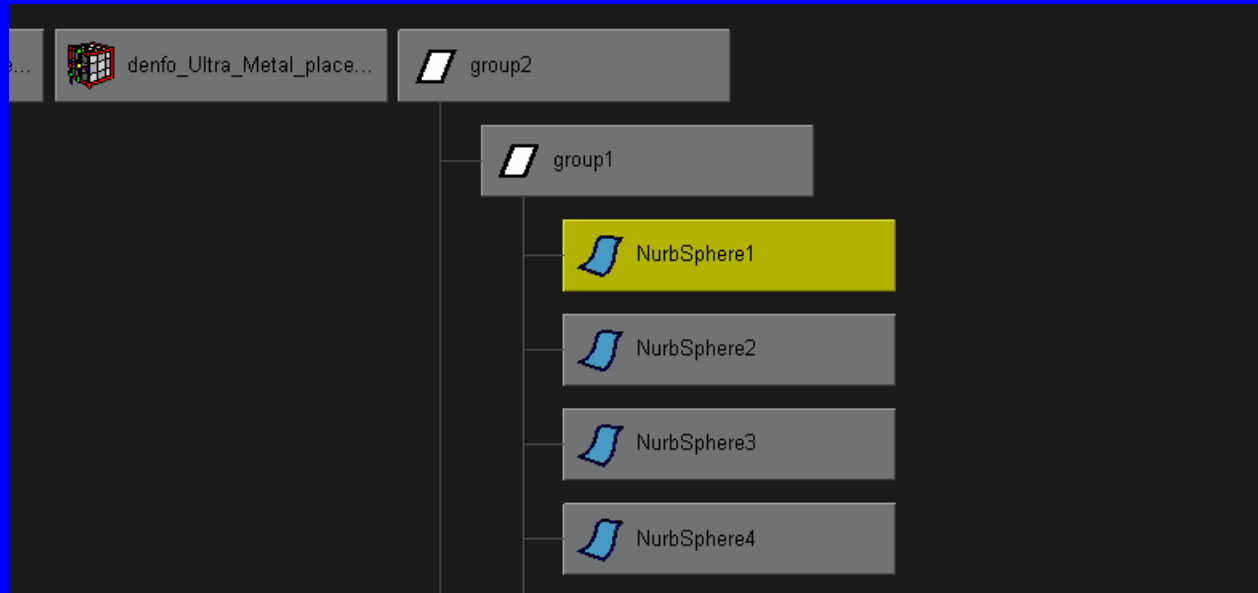
- Scene – the entire scene, what we are animating. Your work gets stored in a scene file.
- Project – a way to collect resources together, including multiple scene files.
- The Dependency Graph/Scene Graph
- Nodes
- Attributes
- Transform Node
- Shape Node
- Input Node







Maya Dependency Graph



Important Dependency Graph Nodes

- Transform Nodes – Store location information.
- Shape Nodes – hold geometry information.
- Input Nodes – hold information that “drives” other node attributes. Ex makeSphereNode has radius information.
- Material Nodes – hold coloring information.

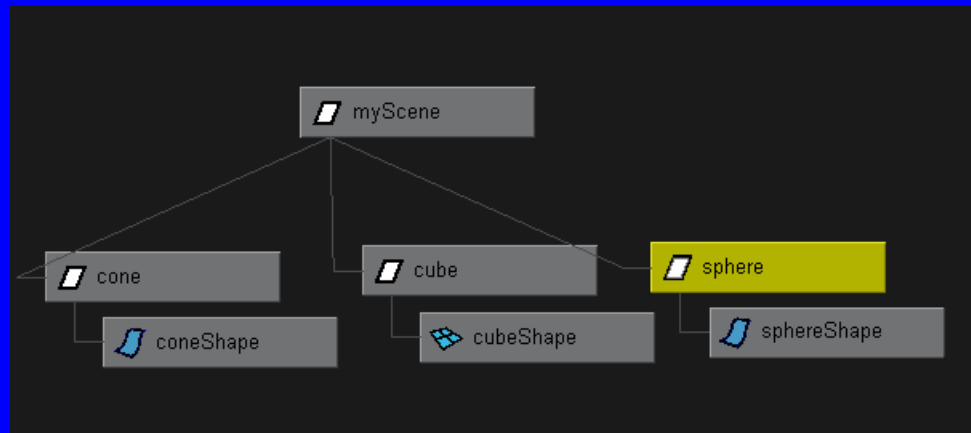


Maya Rendering Process

- In reality there are many steps in this.
- Basic Process:
- Evaluate the graph for current frame. This sets all Node attributes to specific values.
- Traverse the graph and render each node in the order it is reached.



Maya Rendering Process



Maya Internal Architecture

Maya User Interface

MEL Script Editor

MEL Interpreter

Maya Programmer's API – C/C++

Render Engine

Dependency Graph