**Lighting Part B**

-Lighting and storytelling

**Things to think about:**

-Composition

 A way of **organizing or arranging elements** within an image to **convey the main idea** or goal of the work, as well as **direct the viewer’s eye** around the image to the main subject (**focal point**).

 The primary objective is to show the viewer where to look at.

-Contrast (Shadows & Highlights)
 Light creates **lines, contours and shapes** to direct the eye in the composition.

-Color & Mood
 Lighting is important in **establishing mood** and is very powerful in effecting us emotionally and or physically.
 **Color can influence how someone feels (especially when it’s universal to all cultures). It allows the audience to become emotionally involved with the story and characters.**

-What time of the day is it?

-Where is the main light source?
 -Finding your keylight

**Different lights to use:**

**Area Light:** In Maya, area lights are two-dimensional rectangular light sources. Use area lights to simulate the rectangular reflections of windows on surfaces.

Compared to other light sources, area lights can take longer to render, but they can produce higher quality light and shadows. Area lights are particularly good for high-quality still images, but less advantageous for longer animations where rendering speed is crucial.

Area lights are physically based—there is no need for a decay option. The angles formed with the area light and the point that is shaded determine the illumination. As the point moves further away from the area light, the angle decreases and illumination decreases, much like decay.

Can achieve a very pretty look without much tweaking, but tends to add significantly to render time.

**Arnold Area Lights:** Behave similarly to Maya lights but can change shape depending on its use(cylinder, disk, quad). Arnold area lights are often less glitch than maya area lights since they are specifically tailored to maya. Recommend using these in most cases, just for consistency’s sake

**Direction Light:** Use a directional light to simulate a very distant point light source (for example, the sun as viewed from the surface of the Earth).

A directional light shines evenly in one direction only. Its light rays are parallel to each other, as if emitted perpendicular from an infinitely large plane. It’s simple, straightforward, and low cost for rendering. It only points one direction, unlike the area light. **Point Light:** A point light shines evenly in all directions from an infinitely small point in space. Use a point light to simulate an incandescent light bulb or a star.

**Spotlight**- A spot light shines a beam of light evenly within a narrow range of directions that are defined by a cone. The rotation of the spot light determines where the beam is aimed. The width of the cone determines how narrow or broad the beam of light is. You can adjust the softness of the light to create or eliminate the harsh circle of projected light. You can also project image maps from spot lights.

Use a spot light to create a beam of light that gradually becomes wider (for example, a flashlight or car headlight)

**Mesh Light:** A light that you can create by adding light to mesh, good for creating a unique shape of light.

**Skydome Light:** creates a circular dome of light. Evenly lights object from all sides. Can be used with a light portal to help direct the light to a more precise position.

**Physical Sky:** Simulates an outdoor blue sky

**Photometric Light:** Require IES file, but simulate real lights(flashlight, fluorescent light, etc) based on whatever IES file you have attached to it.

**Light Portal:** Used in tangent with Skydome light to direct it’s light through an opening going into an interior. Used primarily for light coming in through windows or gaps into an interior space.

**LIGHTING THE SHOT**

**For the first part of this assignment, stick closely to the following instructions and adjust where necessary, for the 2nd part feel free to experiment more with lights.**

* We are going to be working with exposure for this assignment instead of intensity, this is an attribute under the arnold tab**. BE CAREFUL SINCE IF YOU START USING INTENSITY THE LIGHT WILL NOT BE ABLE TO USE EXPOSURE AND VICE VERSA.**
* You can render out your scene at any point in order to check your progress, but this scene will take longer to render than the pawn so just be careful on conserving your time.
* Since in this assignment you are going to be working with more objects you will need to adjust the size and position and exposure as you see fit so objects are lit properly. As scenes get more complex there become more and more ways to light them so find the way that achieves the best result
* **Main lights:**
	+ **key\_windows\_light**
		- Create a maya Area light and name it key\_window\_light. This light will simulate light coming from outside, into the room
			* Place this light outside of the window and facing inside
			* Size it up so it is roughly the size of the outside wall
			* Exposure should be set to 17.2
			* Take the volume slider down to 0
				+ We are going to be adding fog later and we don’t want fog to show up on any lights except that one.
			* This light will be connected to everything so leave illuminate by default on
	+ **backlight**
		- Create a maya area light and name it backlight. This light will create basic lighting for the interior of the room.
			* Make this light the width of the room and turn it towards the window and desk
			* Exposure should be 14
			* Turn Specular down to .277, and Volume to 0
			* This light should also be connected to everything
	+ **Ceiling\_light**
		- Create a maya area light and name it ceiling\_light. This light will simulate the direction of light that we are trying to simulate in the room.
			* Make a rectangle and situate above all the objects in the room, and size it up so it’s large enough to cover the width and space of all the objects in the room
			* Set Exposure to 14.5
			* Specular to .5 and Volume at 0

Take these three lights and create a group for them named main\_lights

Now we will be adding in some more lights for all the objects in the scene to fill out some dark places and add a focal point. This is a good time to quickly render out your scene and see how it is looking before you proceed

* **Bulb**
	+ The first light we are making is the bulb a mesh light, this is a light from the arnold tab
		- First select the bulb\_geo from the outliner and then go the Arnold tab, lights, and select mesh light, this will create a light in the shape of the bulb.
	+ Name the light bulb\_light
	+ Set the intensity of the light to 4(since this is an arnold light it is possible to manipulate both intensity and exposure)
		- Then set exposure to 10.5
			* Exposure in arnold lights acts as a multiplier so you don’t have to bump up intensity quite so much
	+ Set Specular to .377 and keep Volume 1
	+ Go to the relationship editor and delink this light from the chair
* **Desk\_light**
	+ Take a maya spotlight and put it top-down over the desk and name it desk\_light. This light will create the focal point and create the illusion of the lamp lighting up the desk
	+ Set the Cone Angle to 60.766 and the Penumbra Angle to 31.083
	+ Set the Color Temperature(Arnold tab) to 3420
	+ Set Exposure under the Arnold tab to 15
	+ Set Volume to 0
	+ In the Relationship Editor de-link the desk light from these items
		- Comic
		- Paper1
		- Paper2
		- Lamp
		- Polaroid
		- Office plant
		- Office chair
		- Pictureframe
* **Papers\_light**
	+ Create a spotlight and place it around the same area as the desk\_light and name it paper\_items\_light. This will act as the light for the papers, since they are lighter items that need more specific lighting.
	+ Set the Cone Angle to 60.766 and Penumbra Angle 31.083
	+ Color Temperature to 3420
	+ Exposure to 14
	+ And volume to 0
	+ This light should only be connected to the following items, so un-check illuminate by default and link the light to:
		- Polaroid
		- Paper1
		- Paper2
		- Comic

Light\_back\_of\_chair\_&\_desk

* + Create a spotlight and place it behind the chair facing towards the window, desk, and chair. This will help fill in some light on the chair and desk to help define the shape better. Name this light back\_of\_chair\_desk.
	+ Set Cone Angle to 51.268, and Penumbra Angle to 50
	+ Color Temperature to 5037, Exposure to 12
	+ Turn Cast Shadows off
	+ Set Volume to 0
	+ This light will be connected to everything
* Plant\_light
	+ Now we are going to create a light for just the plant, since it is in an odd place, behind the light source
	+ Create a spotlight and place it right above the plant light, facing down towards it. Name it plant\_light
	+ Set Cone Angle to 51.268 and Penumbra Angle 50
	+ Color Temperature to 5037 and Exposure to 12.5
	+ Set Volume to 0
	+ Connect this to just the plant
* Right\_items\_fill \_light
	+ Create a spotlight and name it items\_right\_fill, this will help fill in the darker spots of some items on the right side of the desk where they are too dark. Place this light towards the right side of the desk, pointing towards the apple, radio and picture frame
	+ Set Cone Angle to 93.418, Penumbra Angle 50
	+ Color Temperature to 5037, Exposure to 13
	+ Volume to 0
	+ Link this light to only the pictureframe, radio, and apple
* Desk\_soft\_fill
	+ This light will help brighten up the desk a little more
	+ Duplicate the right\_items\_fill light and rename it desk\_soft\_fill
	+ Most settings for this light can remain the same except
		- Turn Cast Shadows off
		- Move the light so it is behind the chair facing down towards the desk at a slight angle
		- Link this light to just the desk
* Left\_side\_cabinet\_fill
	+ This light will help fill out the darker cabinet corner and help define the shape and texture a bit.
	+ Take the right\_items\_fill light and duplicate it, then change these settings
		- Exposure to 14
		- Specular to .162
		- Move the light so it is facing the left corner with the cabinets
		- Connect this light to the Floor, Left Cabinet, Right Cabinet.

Group all these lights together and name the group filler\_lights. Then place it and the main\_lights group together in a singular light group

Adding Fog

* In Render settings go to the Arnold Renderer tab and under atmposphere click the checkered box and select aiAtmosphereVolume
	+ An attribute editor tab will pop open, adjust Density to .018 and samples to 15
	+ Fog should only show up on your mesh/bulb light, if it shows up on other lights go through your lights and make sure volume is turned down to 0

Rendering the Shot

 Make sure your Render settings are as marked below in the Arnold Renderer tab.

- Camera 3
- Diffuse 6
- Specular 2
- Transmission 2
- SSS 1
- Volume Indirect 8

In Render Settings and under the Arnold Renderer tab adjust the settings so they match the above. These will be optimal settings for rendering your image with getting as little pixelation as possible. There will likely still be some visible pixels around the fog, but for now it is fine. This shot can take a while to render so be patient and have something to watch or do on the side while it renders!

To Render the shot use the Arnold renderview and make sure you are rendering from the render camera.

Once it is done go to file and save the image in your folder

Again do not worry if it does not completely match the reference image. The goal of this excercise is to avoid odd shadows, and fill out the shapes of the objects as well as possible. And to make sure your lights are properly named and set up.

**Part B**

For part B, you'll be establishing **two moods** for the same office scene. This where you're free to set up lights any way you want, as long as it invokes some kind of mood in the viewer. You will use the following moods: **joy and sadness.**

You can either find your own reference (Find 3 reference images for a mood), or use the paintovers and renders for reference. During production, or in industry, it's common for lighters to use color scripts or concept art to help get an idea how to light a particular scene.

**Render out an image of your two mood scenes and save them to turn in with the reference you choose.**

Turn the following into [Collect-It on Catalyst](https://catalyst.uw.edu/collectit/dropbox/emc29/40975%0A):

* Reference images used for your moods with a minimum of two or 1 chosen paintover (the following examples are for the joy mood):
	+ **[lastname]\_[firstname]\_part2b\_joy\_ref\_01.jpg**
	+ **[lastname]\_[firstname]\_partb\_joy\_ref\_02.jpg**
	+ **[lastname]\_[firstname]\_part2b\_joy\_ref\_03.jpg**

or

* + **[lastname]\_[firstname]\_part2b\_joy\_paintover.png**.

*Note: You may create a ZIP folder with all of your files if that is more convenient. Just be sure to use the same naming conventions, and test it to make sure it unzips correctly before turn-in!*

* Maya files containing your lit scenes with the following name convention:
	+ **[lastname]\_[firstname]\_partA.ma**
	+ **[lastname]\_[firstname]\_partB\_joy.ma**
	+ **[lastname]\_[firstname]\_partB\_sadness.ma**
* Two images of your lit scenes with the following name convention:
	+ **[lastname]\_[firstname]\_partA.png**
	+ **[lastname]\_[firstname]\_partB\_joy.png**
	+ **[lastname]\_[firstname]\_partB\_sadness.png**
* Any extra files linked in your scene using the exact same names. For example, you would need to include any image that is mapped to a light's color channel.