



"CDICAE - Collaboration to Design an Innovative Curriculum for Animation Education - 2017-1-TR01-KA203-046117 " project carried out by Republic of Turkey Ministry of EU Affairs, Education and Youth Programs Center Presidency and Erciyes University Faculty of Fine Arts, Visual Communication Design Department within the scope of the Collaboration for Innovation and Exchange of Good Practices within the framework of Strategic Partnerships for ERASMUS+ Program KA2 Higher Education Programs.



2D Facial Rigging in 3D Virtual Environment Course Instructor's Guide (O3. 2D Facial Rigging in 3D Virtual Environment Course)

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ACTIVITY 1(1.WEEK)

NAME OF THE EVENT: Virtual Reality and Animation Sector

OBJECTIVE: To inform students about what VR technology is at the basic level and to gain an overview about the relationship of Technology with the cinema-film industry and to increase their awareness about how they can use Virtual reality technology in the animation industry.

LEARNING OUTPUT: Participants;

- They become more aware of what virtual reality technology and hardware are and their usage areas.
- Understand the use of virtual reality technology in the cinema-film industry.

MATERIAL: Illustrated PDF file presentation with projector

(R1_TR_SANAL_GERCEKLIK_VE_UYGULAMA_ALANLARI.pdf)

(R1_EN_InTech_UnderstandingVirtualRealityTechnology.pdf)

(EK_1A_TR_Sanal-Gerceklik-Donanim ve Kurulum-Talimatlar Kilavuzu)

(EK_1A_EN_Virtual-Reality-Setup-Instructions-and-Troubleshooting-Guide)

(<https://www.lib.ua.edu/wp-content/uploads/Virtual-Reality-Setup-Instructions-and-Troubleshooting-Guide.pdf>)

DURATION: 150 mins(3 hours).

PROCEDURE:

1. "R1_TR_SANAL_GERCEKLIK_VE_UYGULAMA_ALANLARI.pdf" document is opened in the projection and information is given about the hardware and the areas of use of vr technology with the help of a picture presentation and verbally.
The following definition is given to the students;

* Virtual reality, also known as "virtualreality", is a rapidly developing and popularizing technology. This technology, which is human and computer interactive, which created the environments with computer technologies, which makes them feel as if they were inside, started to be developed on the idea that human senses could be misled. Virtual reality has some basic features. The first is that, first of all, it gives its users the feeling of being real. The user should be able to go wherever he wants in this environment created by computers, that is, he should feel that the control is in his hands. This can only be achieved through interaction. Thus, the user will be able to interactively determine the destination and direction in which he is looking. It is possible to walk in computer-generated environments by combining a number of position-tracking devices with such glasses. The sense of sight can undoubtedly be extended to include the ability to move objects around, touch, feel their physical characteristics, and hear the sounds in the environment. Naturally, these possibilities are possible with some special gloves, three dimensional sound concept and similar technological tools. Of course, it should be noted that the aforementioned environments are unreal, computer-generated worlds. In a VIRTUAL REALITY system, powerful computers are required to move in real time. Here computers will act as Reality Engine. It will enable access to databases of three-dimensional geometries of objects and run application programs to coordinate all the sensory sensing instruments and hardware mentioned so far. These features are necessary for us to fully experience virtual reality.

Virtual Reality, which has many application areas from the world of Entertainment-Cinema-Education to complex scientific experiments in Medicine, is a three-dimensional analogy model that gives its users a feeling of realism, and enables the opportunity to interact with a 3D dynamic environment created by computers "and then;

The basic hardware and features of virtual reality (using the installation booklet) are explained with the PDF presentation.

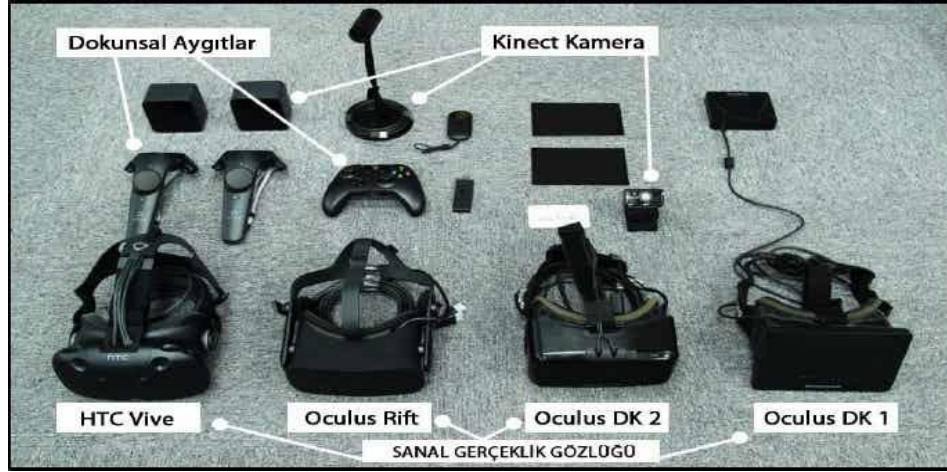
(EK_1A_TR_Sanal-Gerceklik-Donanim ve Kurulum-Talimatlar Kilavuzu)

(EK_1A_EN_Virtual-Reality-Setup-Instructions-and-Troubleshooting-Guide)

During the presentation;

Virtual reality enhancements are introduced by supporting them with pictures;

Virtual reality is a set used device. Basically, the headset consists of controllers (special joystick produced for vr), sensors, PC connection cables, battery, (hdmi - usb) connection cables. This set should be used by connecting to a PC capable of running its own software.



Visual 1. Virtual Reality Equipment

The first thing we need to know is the device named HEADSET. The user should use it by adjusting the sharpness according to his own eyes and adjusting the position on his head with the adjustment strips on this device.



Visual 2. Oculus Rift Virtual Reality Headset



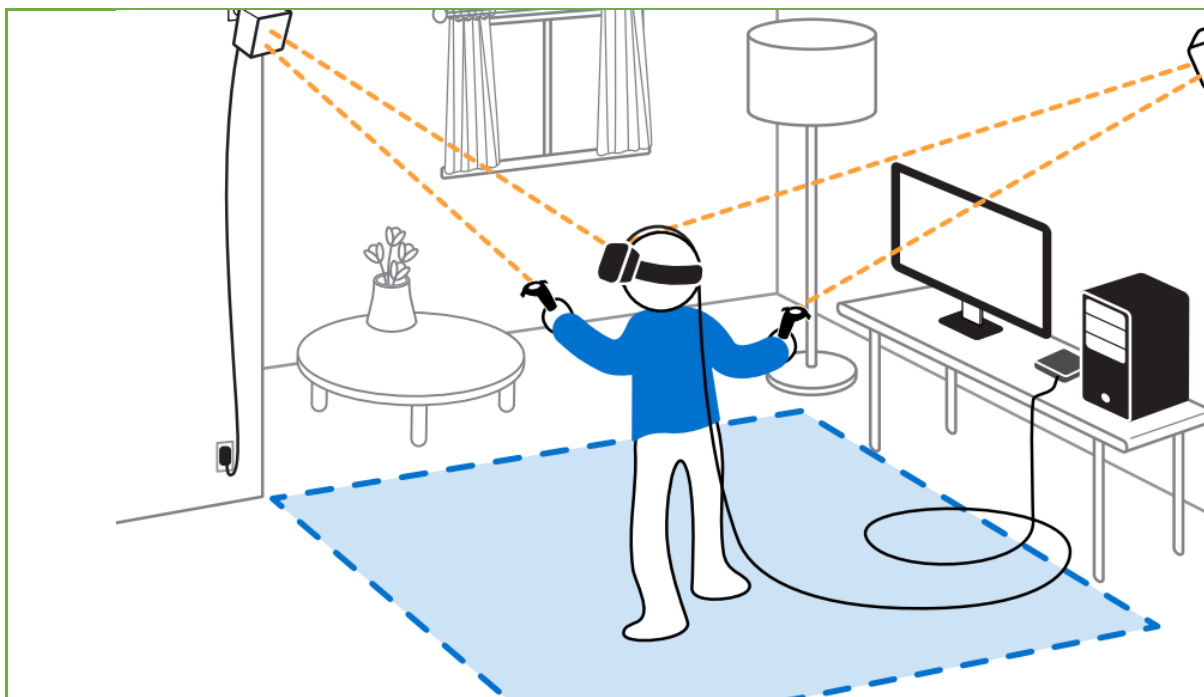
Visual 3. Example of using the VR Header

Then, after the user connects the sensors to the required ports and connects the hardware cables to the connection points on the pc, he connects the controllers' batteries and integrates the hardware with the pc.



Visual 4. Other equipment of the VR set (sensors-Controllers-battery-adapter)

As the last step, by preparing the necessary vr software, it prepares the vr hardware.



Visual 5. Basic installation form of VR Header

After the students are informed about the general setup;

*** Students are given brief information about the usage areas of virtual reality and their ideas about what to do in their fields are taken.**

Use in education

With the education sector, which is one of the most productive areas of VR technology, distance education has become a better quality. Students' ability to comprehend the lessons practically with the created environment has facilitated lessons such as physics and geography where three-dimensional environments are important.

Use in the field of health

One of the first and most important uses of virtual reality technology is the health sector. With the three-dimensional presentation of the human body, practical gain in various and especially risky surgical applications has increased.

Use in architecture

The use of virtual reality technologies is also very important in the architecture and construction industry, which is one of the areas where visuality is the most necessary. This technology, which will allow customers to realize the ready-to-use forms of houses that are still under construction, to enable customers to navigate inside the rooms of the house, provides many facilities for the construction industry.

Use in the field of Culture and Tourism

It is now possible to present natural beauties, historical places and museums in a 3-dimensional and realistic environment with virtual reality technologies without going to the place where they are located. The fact that it is an application that can be very useful especially in promoting countries abroad increases its importance in this sector.

Use in the entertainment field

In the entertainment industry, which is the most widely used area of VR technology, games, movies and various broadcasts can be developed in a way that enables the user to feel really

in that environment with virtual reality glasses. It would not be wrong to say that one of the sectors that adapt fastest to virtual reality technology is the entertainment industry.

* In order to understand how much knowledge and experience they have about students' readiness with "VIRTUAL REALITY" technology; "**Whether they have experienced Virtual reality game or application in any way before and what kind of applications they have tried**" are asked and based on these experiences, they are asked how they can use "Virtual Reality" in the animation area and feedback is received. (Considering that they learned animation in previous periods)

* At this stage, students are asked to discuss whether virtual reality can be used for auxiliary, developer purposes in areas such as modeling, animation and rigging that they have previously learned.

ACTIVITY 2(2.WEEK)

ACTIVITY NAME: Installing Virtual Reality and Animation Software and Introducing the Hardware

OBJECTIVE: To provide students with a physical understanding of SG Hardware and to understand how to install and install SG software to be used in SG environment.

LEARNING OUTPUT: students;

- They learn how to install virtual reality equipment.
- They learn what software to use in virtual reality hardware and how to calibrate the hardware by installing these software.

MATERIAL: Video Presentations describing the installation of software

Projector

Internet connection

1 Oculusrift hardware (4 batteries AA size)

1 pc with sufficient hardware,

A sufficient (2x2 meters) wide classroom area to set up and use the Oculusrift

R2. EK_1A_TR_Sanal-Gerçeklik-Donanim ve Kurulum-Talimatlar Kilavuzu

EK_1A_EN_Virtual-Reality-Setup-Instructions-and-Troubleshooting-Guide

<https://www.lib.ua.edu/wp-content/uploads/Virtual-Reality-Setup-Instructions-and-Troubleshooting-Guide.pdf>

Additional narration videos

DURATION: 150 mins(3 hours).

PROCEDURE:

1. The equipment required to use the OCULUS RIFT equipment is presented to the students physically;

Devices in the class are shown respectively:

What we need to use the OCULUS RIFT hardware;

1 set of OCULUS RIFT head

1 sufficient PC (or laptop)

4 AA size batteries

Internet connection

and it is called oculusrift software.

2. After these enhancements are shown, students are asked to physically examine and observe the equipment (at this stage, students may be asked to wear the vr cap and put the joysticks in their hands);

3. Then, the names and basic features of the software to be installed are explained;;

Respectively;

Oculus Rift basic software is the basic software required for us to use the vr device.

www.oculus.com/setup

* After opening the PC and checking the internet connection, the projection connection is opened to enable the students to see the PC screen and;

1. 8. Students are told that before installing the vr software, we need to test the PC by running the necessary software to check whether the hardware features of the PC to be used are sufficient. "A_kontrol_pc_uyumluluk_OculusCompatCheck" program in the attachment file is run by double clicking....

After starting this tool, whether the PC is sufficient is verified as shown in the reference video. (Reference video "1_oculus_pc_uygunluk_test_araci" found in supplementary files).

2. 9. Open a blank Internet Explorer page on PC, go to "www.oculus.com/setup" and click on Download OculusRift Software to start downloading the software. (Reference video "2_oculus_adresten_indirme" included in additional files).
3. 10. After the download is finished, open the "Oculus" application in the downloads folder and click Install Now. **(Reference video included in supplementary files "3_indirilen_yazilimi_kurma"ve "4_indirilen_yazilimi_kurma_").**
4. After the "Oculus" software is installed, the second phase of the installation is passed and students are told that we need to create an oculus account in order to use the software, and an oculus account is created by following the instructions in the additional video. **(Reference video included in supplementary files "5_Hesap_olusturma).**
5. After completing the account creation phase successfully, the vr device installation is completed by following the instructions in the installation videos numbered 6-7-8. **(Reference video included in supplementary files "6_Kurulum_yonergeleri-7_Kurulum_yonergeleri-8_kullanım_alanı_belirleme).**
6. After the general software installation is completed, students;
Since the experiences in the VR device are virtual environments, it is said that they should take safety precautions to avoid injuries by hitting the objects in their environment from time to time, and the " **9_kullanım_güvenliği_alanı_belirleme**" instructions in the supplementary file is removed and the objects that will cause injury in the environment are removed.
7. After the completion of the installation phase, Students;
The software required for us to use the VR hardware is finished installing and we can now experience the hardware, so that every student wears the VR glasses and experiences basic oculusrift menus.

ACTIVITY 3(3. WEEK)

NAME OF THE EVENT: Installing Virtual Reality and Animation Software and Using Hardware

OBJECTIVE: To provide students to comprehend how to install 3d software that they will use with SG Hardware.

LEARNING OUTPUT: students;

- Learn which 3D software should be installed and how to install it in virtual reality hardware.
- They experience the innovative aspect of using “3D software” at “BASIC LEVEL” in a virtual reality environment.

MATERIAL:

Projector

Internet connection

Video Presentations describing the installation of software

1 Oculusrift hardware (4 batteries AA size)

1 pc with sufficient hardware,

A sufficient (2x2 meters) wide classroom area to set up and use the Oculusrift

DURATION: 150 mins(3 hours).

PROCEDURE:

1. After the projector is turned on and connected to the PC, the students are told about the “AutodeskMaya” software required to use the OCULUS RIFT hardware, by watching the installation additional video in the following order and asked to apply it to their own PCs.

Respectively;

- “EK_3_A_Autodesk MAYA download video” in the additional files is opened on the projection device and the students are asked to follow the instructions in the video, respectively.
- By opening a blank Internet Explorer page, go to www.autodesk.com/education/free-software/maya.
- Students complete their registration process at www.autodesk.com/education/free-software/maya according to the instructions in the "EK_3_A_Autodesk MAYA download video."
- Students can then restart their PC by completing the installation phase by following the instructions in the "EK_3_B_Autodesk maya installation video" of the downloaded Autodesk maya software.

2. After the basic 3D software installation is completed, students;

In order to use 3d animation software together in VR environment, it is said that the plug-in software named “MARUI” should be installed and the installation is explained in the following order.

- By opening the “EK_3_C_A_MARUI_plugin_indirme_videosu 4 video narration” projection device in the additional files, the students are asked to follow the instructions in the video in order.
- A blank Internet Explorer page is opened to www.marui-plugin.com/download/trial/request.php.
- Students complete their membership process at according to www.marui-plugin.com/download/trial/request.php the instructions in “EK_3_C_B_MARUI_plugin_kurulum_videosu”.
- Students can then restart their PC by completing the installation phase by watching the downloaded “MARUI” software “EK_3_C_MARUI_plugin installation video”. (Updated installation address <https://www.marui-plugin.com/documentation-installing-activating-starting/>)

3. After the installation of the software is completed,;

- It is said that the "MARUI plug-in" installed in order to be able to use the 3d animation program in the VR environment should be activated before the application and the projection "EK_3_D_MARUI_plugin installation" video is watched and asked to apply on their own pc.

4. After students activate MARUI plugin in Autodesk maya program;

- Each student is asked to open the AutodeskMaya program by wearing the VR cap and experience it at a basic level (It is assumed that they have taken Autodesk maya lessons and have their readiness).

5. After students experience the basic Autodeskmaya program in VR environment;

- The student is asked to ask "How was the idea of the first experience in producing 3D content in the VR environment" and received feedback.

ACTIVITY 4(4. WEEK)

NAME OF THE EVENT: Using Virtual Reality Joysticks and 3D Interfaces

OBJECTIVE: To provide students to understand the face rigging software interface in SG environment and the differences between them according to the PC environment.

LEARNING OUTPUT: students;

- They learn how to use the "VR IN" version of the 3d software they will use in virtual reality hardware with VR joysticks.
- "In the virtual reality environment, they have a basic understanding of the advantages and disadvantages of the use of 3d software tools in traditional methods.

MATERIAL:

Projector

Internet connection

Video Presentations describing the use of software

1 Oculusrift hardware (4 batteries AA size)

1 pc with sufficient hardware,

A class space sufficient (2x2 meters) wide to use Oculusrift

Video Source <https://www.marui-plugin.com/support/>

<https://apps.autodesk.com/MAYA/en/Detail/HelpDoc?appId=265209227563613977&appLang=en&os=Win64>

DURATION: 150 mins(3hours).

PROCEDURE:

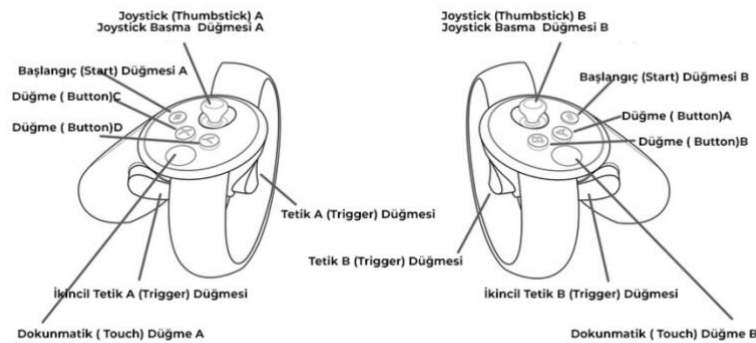
1.TO students; (It is observed that they have experienced "animation" in the pc environment before.)

It is stated verbally that "they need to learn different tools and shortcuts (VR joystick and Marui interface) in order to use the software they use with the MOUSE and keyboard in the Vr environment.

Explanation of the keys in the Oculus Rift joysticks;

MARUI supports three different types of control: HTC VI's "wand" style controllers, OculusRift "Touch" controllers, and Windows MR controllers.

While each of these have different shapes and functions, the basic interaction is the same in all



three.

Visual 1. Oculus rift joystick buttons

Trigger Buttons (Trigger)

* The button under the index finger is called "Trigger" (similar to the trigger of the gun) and is the same function of the left mouse button. That is, it is used to select objects, drag objects and move windows.

It can be used in two ways: a "click" and a "drag".

* "Click" is short-term "press and release" on the trigger, similar to "clicking" with the mouse, without moving the controller too much.

For example, you can "click" to select them in VR objects, you can use your mouse to select the way you use it in Maya.

* To drag, simply hold down the trigger while moving the controller.

For example, by holding the trigger and "dragging", you can draw a selection box to select multiple objects, just as you draw a selection box with your mouse by holding the left mouse button in Maya.

Grip Buttons

The keys (operated by the middle finger) on the side of the shaft of the controllers are called the "grip" or "shoulder" buttons. In MARUI, these are used to change your perspective on the stage. To change the camera position in Maya, you hold down the Alt key and change your perspective. Similarly, in MARUI, you hold down the shoulder buttons to change the perspective of objects in VR.

By holding down the shoulder buttons on both controllers and changing the distance between the controllers, you can "zoom in and out" to make your Maya scene appear on a larger or smaller scale. Note that this does not organize your scene in any way. This just changes the way you see the scene in VR.

Thumb Buttons (A-B-Oculus-X-Y Buttons)

Various VR controllers have buttons on the top to be operated with a thumb. On OculusRift "Touch" controllers, these are the buttons (A) (B) (X) and (Y). HTC Vive and Windows MR controllers each have a "Menu" controller.

In MARUI, the default menu assigns circular menus (marking menus) to these buttons. If you hold down the button, a menu will appear at the end of the controller.

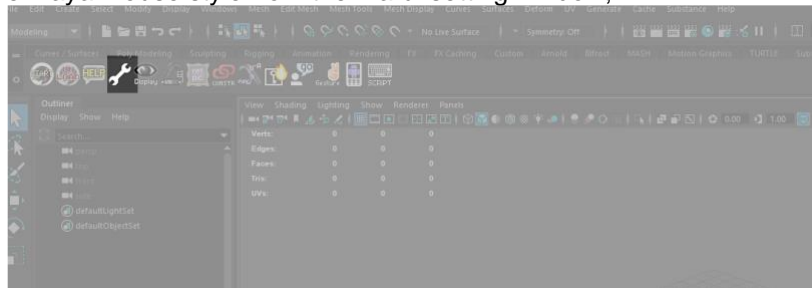
You can select items in the menu in two ways. Move the controller to place the red arrowhead on the item you want to select (a tooltip text describing the icon will appear) and release the button you pressed to open the menu. Alternatively, instead of releasing the menu button, you can also press the trigger button of the controller (in addition to holding down the menu button "click"). This is especially useful if you need to trigger a menu item multiple times.

Thumb (ThumbStick)

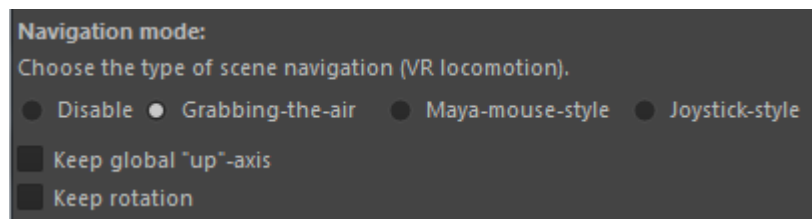
The OculusRift and Windows MR controller also have small joysticks on the top that will be operated by the thumb. MARUI assigns additional menus to tilt the bar in one of four directions: forward, backward, left and right. Press the thumb bar forward to open the "Thumb forward" menu. The same goes for pushing the adjustment knob left or right or pulling backwards. Each direction opens a different menu.

Navigating mouse style maya viewport;

In Maya, you usually use the mouse to rotate the camera around a selected object. If you prefer this type of interaction, select the "Maya-mouse style" navigation function in the settings. To do this, select the Maya mouse style from the marui setting window;



Visual 2.Marui settings



Visual 3.Marui Mouse settings

While this mode is active, holding down the navigation button allows you to rotate your perspective around the selected object, it will be narrated and then;

Students are asked to watch the video opened in the projector and take notes and individually experience the interface on the vr device;

- The video titled "Using Autodesk maya interface in EK_4_A_VR environment" in the additional files is opened and the instructions in the video are taken notes to the students.
- While watching the video, it is asked whether there is a feature that they cannot understand or want to ask in the VR interface according to the traditional PC environment; Depending on the feedback, the parts described in the video can be explained and explained again.

2. After watching the Autodesk maya interface video;

- After the video presentation, from the students; By wearing the VR cap, they are asked to experience it individually with the instructions described in the video with the Maruiplugini in the Autodesk maya program.
- The PC screen image used for viewing the experience of the students watching during this experience is reflected on the projection and the students who experience the title can be verbally helped about the shortcut and usage.

3. After students experience the Autodesk maya program with a basic level MARUI interface in VR environment;

- The student is asked to evaluate the experiences of using MARUI interface in VR environment according to their experience in pc environment, and they are asked to realize and interpret the advantages and disadvantages of producing 3D content with VR.

ACTIVITY 5(5. WEEK)

ACTIVITY NAME: Face Rigging Project Management with Virtual Reality

OBJECTIVE: To provide students to comprehend “Project management (preparation) required for Face rigging (character skeleton dressing) in SG environment.

LEARNING OUTPUTS: students;

- Understand how they will make preparations such as Project set-up, foldering, naming, calling the character, recording scene, addressing the picture, preparation of the rigging interface etc.
- Users realize the advantages and disadvantages of the use of 3d software tools in traditional methods in the virtual reality environment at the production level by using the rigging tools.

MATERIAL:

Projector

Internet connection

Video Presentations describing the use of software

1 Oculusrift hardware (4 batteries AA size)

1 pc with sufficient hardware,

A class space sufficient (2x2 meters) wide to use Oculusrift

R.6 (PAGE 58-60)

R.5 (PAGE 35-38)

DURATION: 150 mins(3 hours).

PROCEDURE:

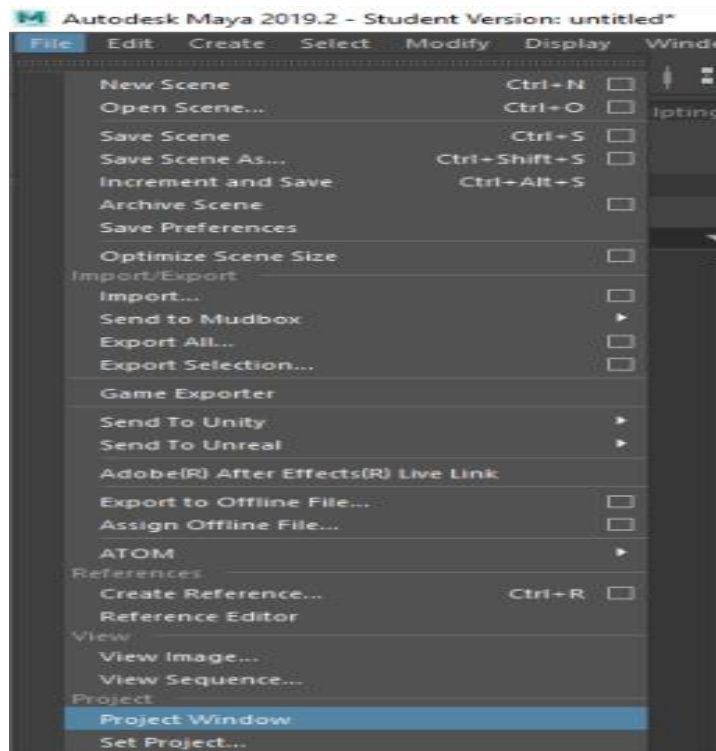
1. To students;

It is stated verbally that the first stage required to implement the software to be used for face rigging in the virtual reality environment is the preparation of the project management flow, and then;

* It is said that the previously modeled 3d character, the pictures to be used with this character, the assets to be used on the stage should be prepared as a Project set and that the Autodesk maya interface should be converted into a rigorous module.

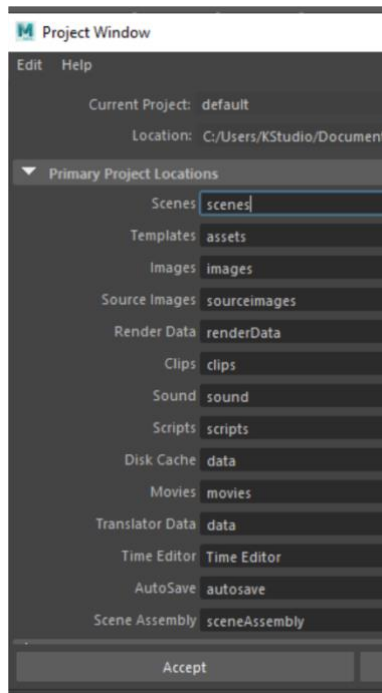
Project Set Up in Autodesk Maya program;

Project window opens in Maya File menu,



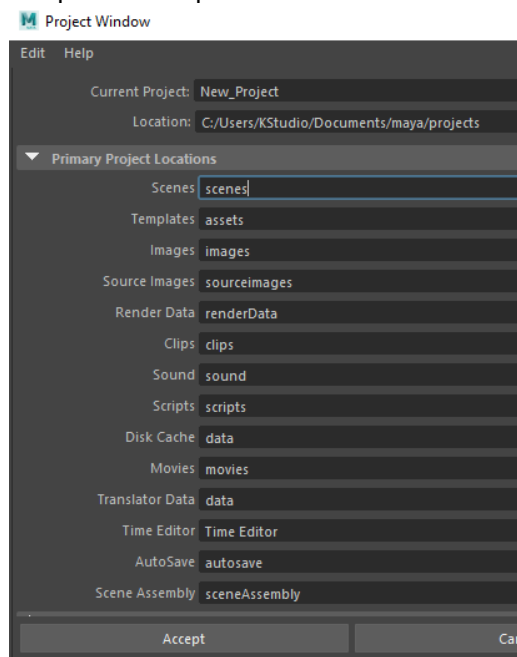
Visual 1.Maya file menu

Then click on the new tab of "Project Window" that opens.



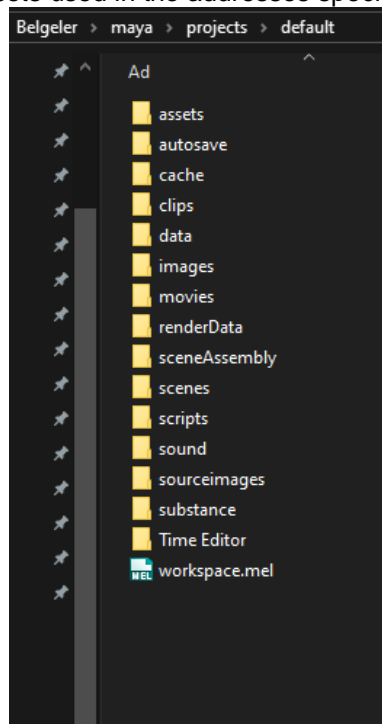
Visual 2. Project window

In the activated panel menus, the project name, project folder addresses and other necessary addresses are made and the accept button is pressed.



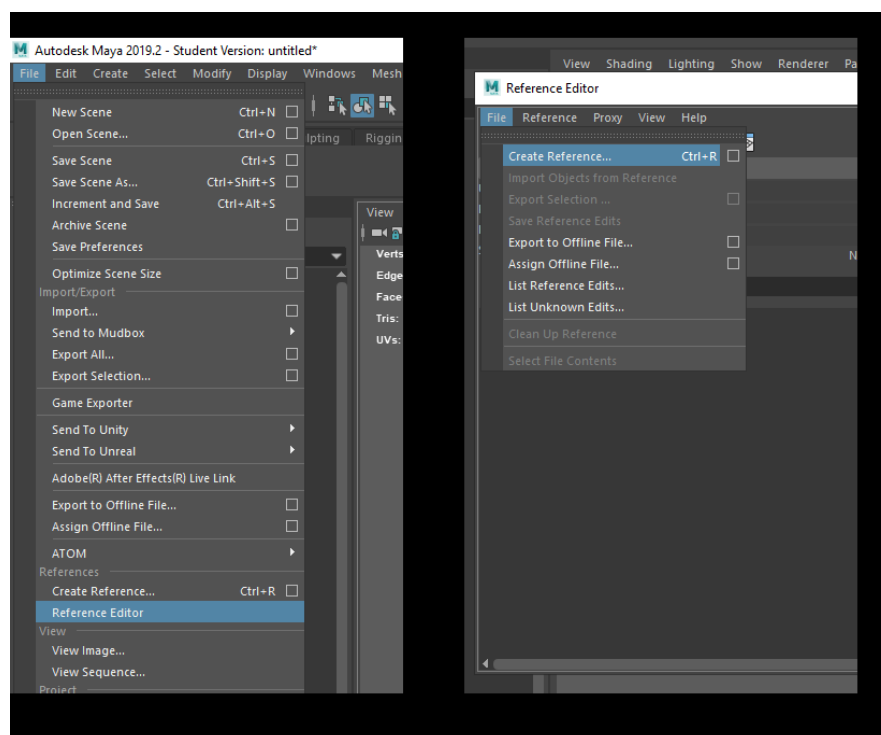
Visual 3. Project window

After this addressing process is finished, the folder process is completed by copying the characters, images and assets used in the addresses specified in the Windows explorer.

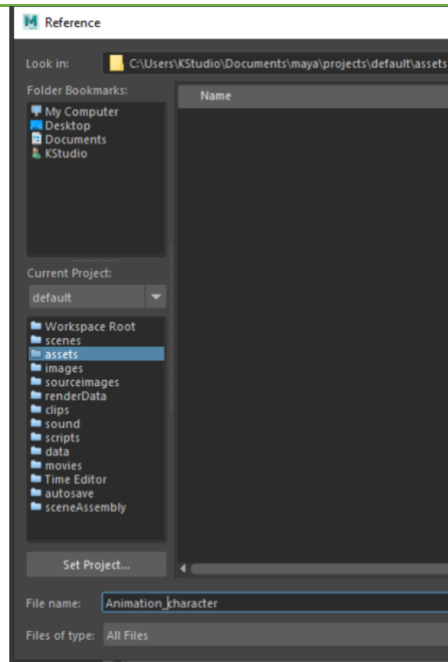


Visual 4. Project window

After this foldering process is completed, a blank stage is opened in the maya, and the required character and assets are called to the stage by clicking on the reference method "Createreference", then the RIG (skeleton dressing) module is opened and the Basic Rig scene is recorded and saved, and the first stage preparation required for us to use the rigging tools is completed.



Visual 5. Create reference editor



Visual 6.Create referenceeditor

Students are asked to watch the video opened on the projector and take notes;

- The video titled “Preparation of Autodesk maya project workflow in EK_5_A_VR environment” in the supplementary files is watched and the instructions in the video are taken into consideration.
- While watching the video, it is asked whether there is a question that they cannot understand or want to ask about “project workflow preparation” in VR environment compared to Traditional PC environment; Depending on the feedback, the parts described in the video can be explained and explained again.

2. “After watching the video of "Autodesk maya project workflow preparation" in EK_5_A_VR environment, students are asked to apply project management on vr device individually;

- After the video presentation, from the students; By wearing the VR cap, they are asked to perform the applications described in the video individually in the Autodesk maya program.
- The PC screen image used for viewing the experience of the students watching during this application is reflected on the projection and the students who experience the title can be verbally helped about the application.

3. After the students made “Autodesk maya project workflow preparation application in VR environment;;

- • The student is asked to compare the advantages and disadvantages of producing 3D content with VR by comparing the application of “Autodesk maya project workflow preparation in VR environment” according to their experience in the pc environment..

ACTIVITY 6(6. WEEK)

NAME OF THE ACTIVITY: "CREATING A CONTROL OBJECT AND FEATURE ASSIGNMENT" in Virtual Reality and Face Rigging Application

OBJECTIVE: To provide students to understand how to create a control object and assign properties to these control objects in the "FACE RIGGING" study in the SG environment.

LEARNING OUTPUT: students;

- Understand how to create a control object which is one of the "FACE RIGGING" stages to be done in a virtual reality environment and how to assign properties to these control objects.
- In the virtual reality environment, they understand the advantages and disadvantages of the use of 3d software tools in traditional methods at the "FACE RIG" production level.

MATERIAL:

R.5 (page 116-118)

R.6 (page 250)

Projector

Internet connection

Video Presentations describing the use of software

1 Oculusrift hardware (4 batteries AA size)

1 pc with sufficient hardware,

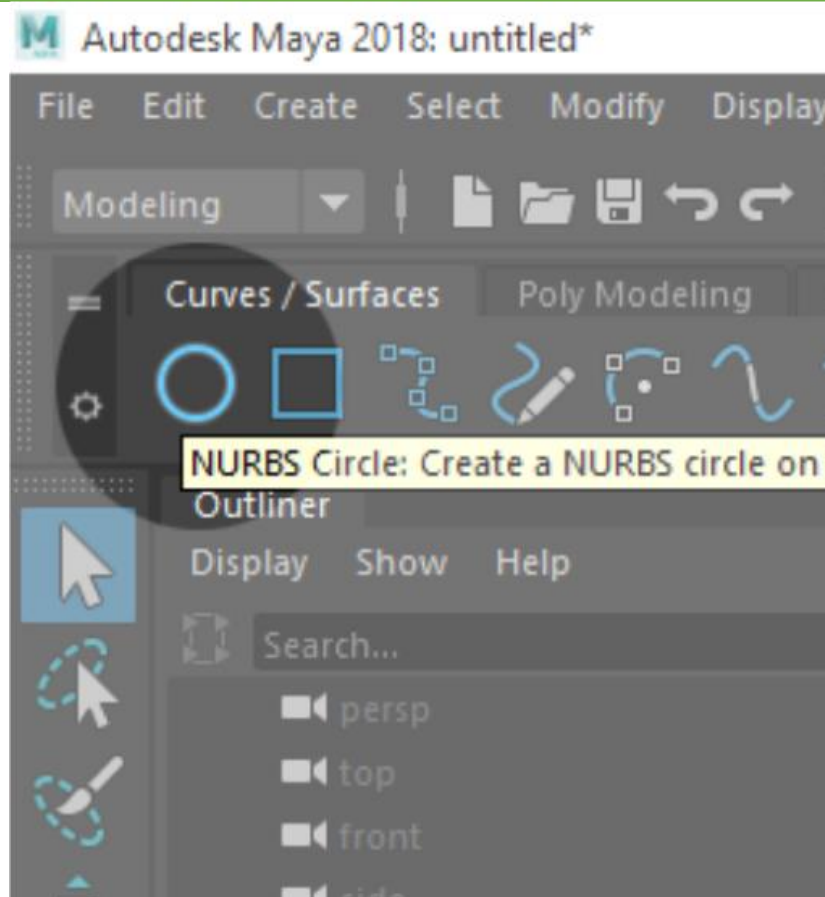
A class space sufficient (2x2 meters) wide to use Oculusrift

DURATION: 150 mins(3 hours).

PROCEDURE:

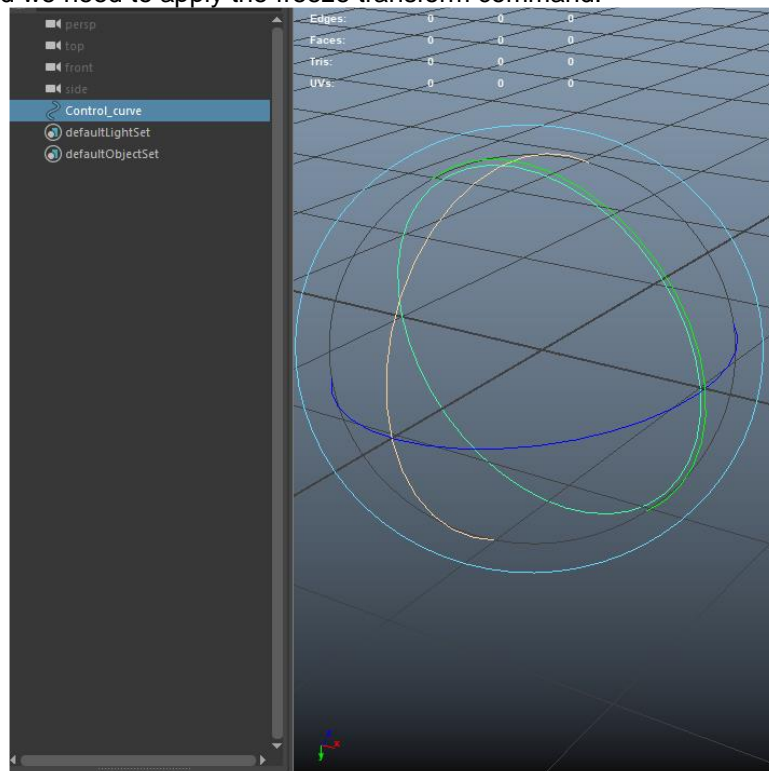
It is stated verbally that we will work on the control object creation and feature assignment application, which is one of the stages required for face rigging in VR, and then;

To students ; In the maya program we are told that we need to create a control object and this object should be curve, and in the image below, we are told that we need to create the controls with the CreateCurve command.

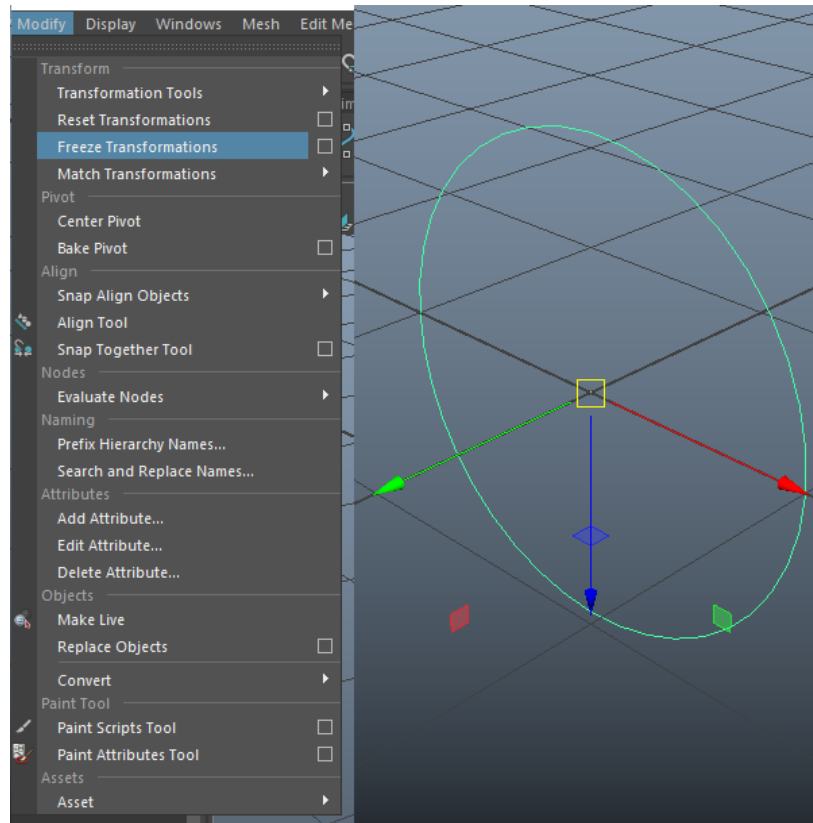


Visual 1.Maya CreateCurve

Then we are told that we have to translate and name the created control curve on the x axis of 90 degrees and we need to apply the freeze transform command.

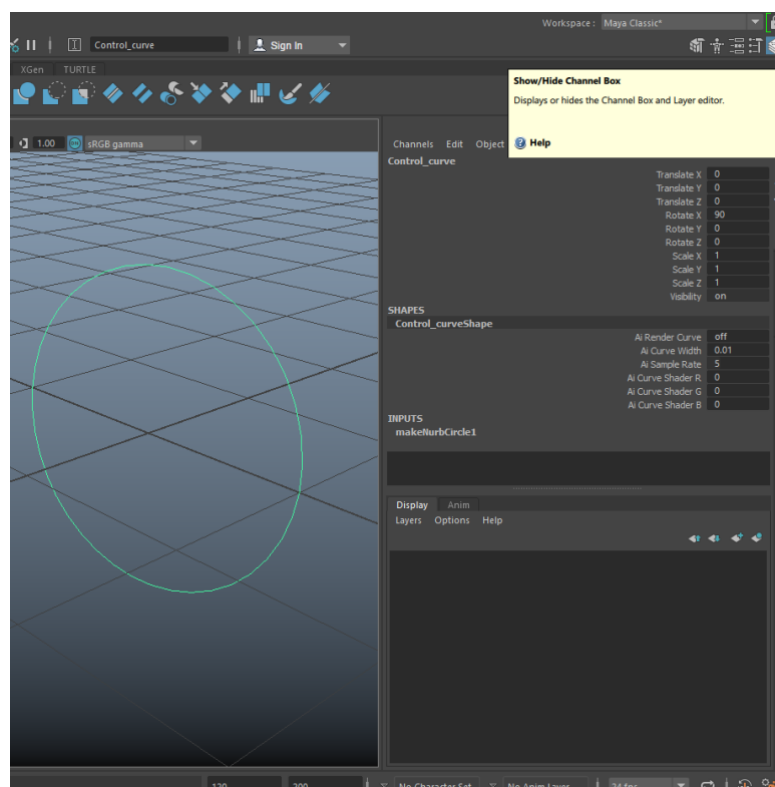


Visual 2.Rotate curve – renamecurve

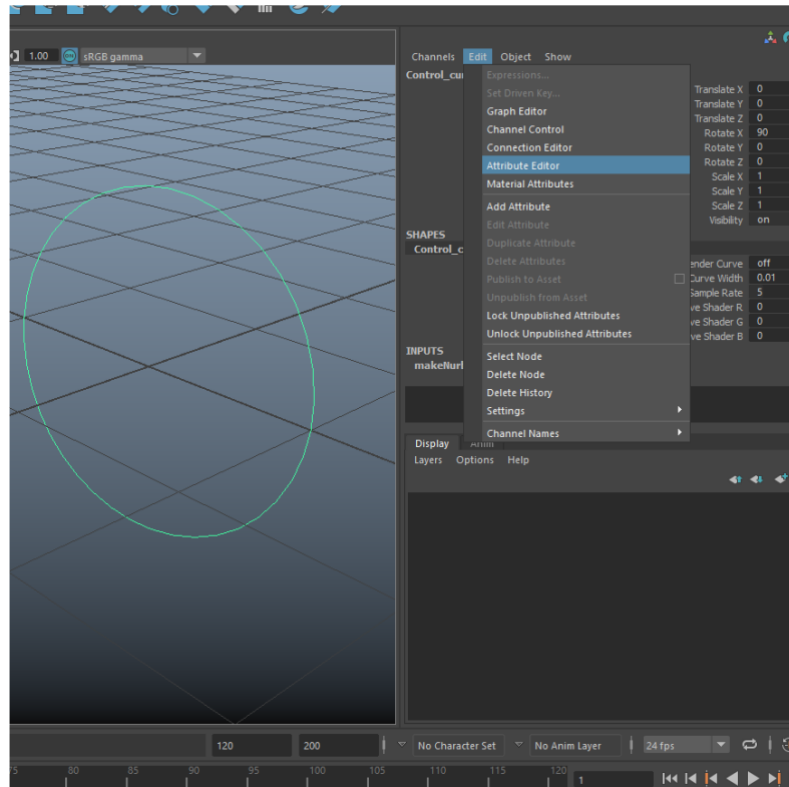


Visual 3. Freeze transform

Then, we are told that we need to open the channelbox panel and click the "addattribute" command from the "edit" menu.

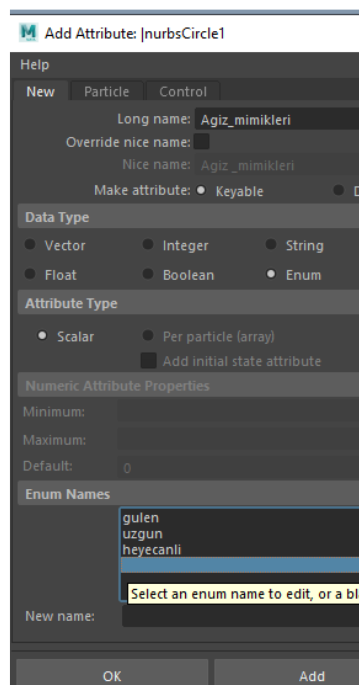


Visual 4. Open channelbox



Visual 5.Add Attribute

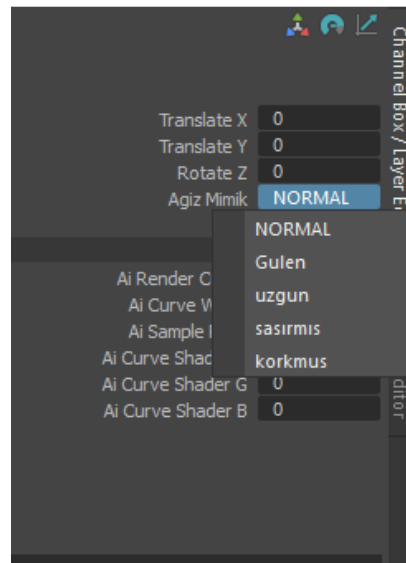
In the addattribute panel that opens, repeat the new curve properties for each mimic with the following settings, and then create the properties with the arrow command. Example Mouth gestures -Glowing mouth sad mouth etc.



Visual 6.Add Attributeoptions

The same application is said to be assigned in the eye control object according to the eye gestures (smiling eye, sad eye, etc.) and it is applied.

After you finish assigning features, check the features assigned in the channelbox panel.



Visual 7. Properties

1. Students are asked to watch the video opened on the projector and take notes;

- The video titled “Creating a control object and feature with Autodesk maya in EK_6_A_VR environment” in the supplementary files is watched and the instructions in the video are taken into consideration.

- While watching the video, it is asked whether there is a question in the VR environment that they cannot understand or want to ask about “creating control object and feature” according to the traditional pc environment; according to the feedbacks, the parts explained in the video can be explained again.

2. After watching the video “Creating control object and feature with Autodesk maya in EK_6_A_VR environment”, students are asked to apply individually on VR device;

- After the video presentation, from the students; By wearing the VR cap, they are asked to perform the applications described in the video individually in the Autodesk maya program.
- The PC screen image used for viewing the experience of the students watching during this application is reflected on the projection and the students who experience the title can be verbally helped about the application.

3. After the application of “Creating control object and feature with Autodesk maya” in the VR environment;

- The student is asked to compare the “Autodesk maya with control object and feature creation” application according to their experience in the pc environment, and they are asked to interpret the advantages and disadvantages of producing 3D content with VR.

ACTIVITY 7(7. WEEK)

NAME OF THE ACTIVITY: "EYE IMAGE ATTACHMENT AND MOVEMENT CONNECTION STAGE" in Face Rigging Application with Virtual Reality

OBJECTIVE: In the "FACE RIGGING" study in the SG environment, to enable students to comprehend how to link the control object properties with the character's eye picture and how to act.

LEARNING OUTPUT: students;

- The control object, which is one of the "FACE RIGGING" stages to be done in the virtual reality environment, understands how to connect the character's eye picture and how to act.
- Understand the advantages and disadvantages of the use of 3d software tools in traditional methods in the virtual reality environment at the "FACE RIG" production level.

MATERIAL:

Projector

Internet connection

Video Presentations describing the use of software

1 Oculusrift hardware (4 batteries AA size)

1 pc with sufficient hardware,

A class space sufficient (2x2 meters) wide to use Oculusrift

R.5 (chapter 2-8-9)

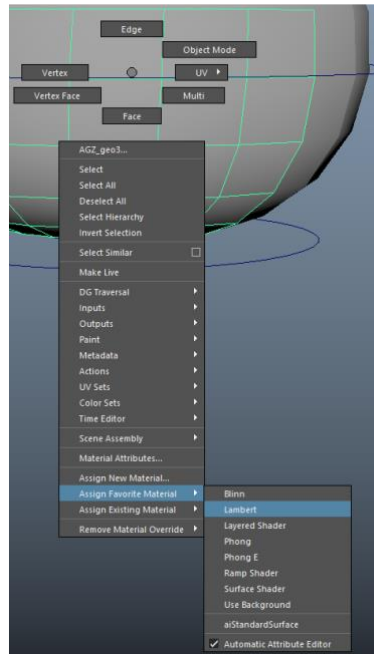
R.6 (page 231-236)

DURATION: 150 mins(3 hours).

PROCEDURE:

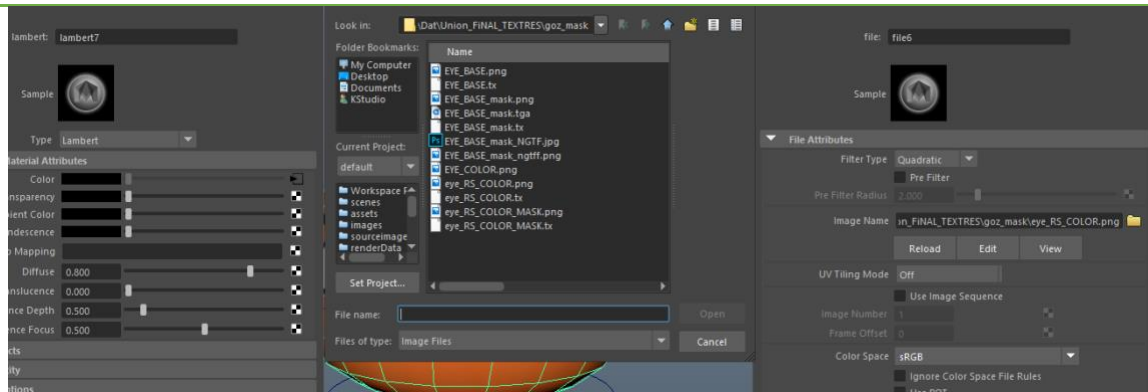
The students are told that we need to define the necessary images (eye picture, mouth picture, etc.) to the control objects (eye mouth, etc.) that we have created and assigned in the previous lessons, and we need to make a connection to the movement and they are explained in the following order;

First, we select the object of the eye and apply the command "assignnewmaterial" to apply new material to our 3D object.



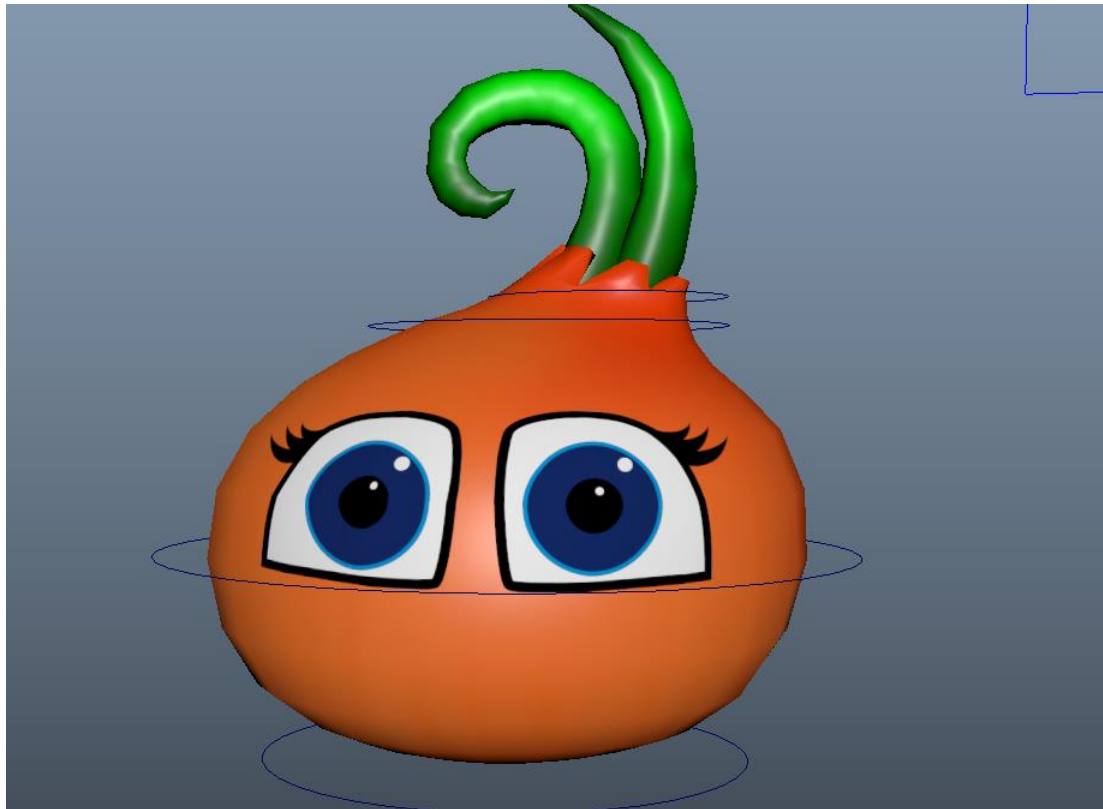
Visual 1. assigning material

Then, we define the eye picture we have previously drawn from the address we saved in the eye object by clicking on the color assignment section of the color panel from the attribute panel of the material we assign. By pressing the 6 key on the keyboard, we make the pictures appear in the maya scene.



Visual 2. Image addressing to the assigned material

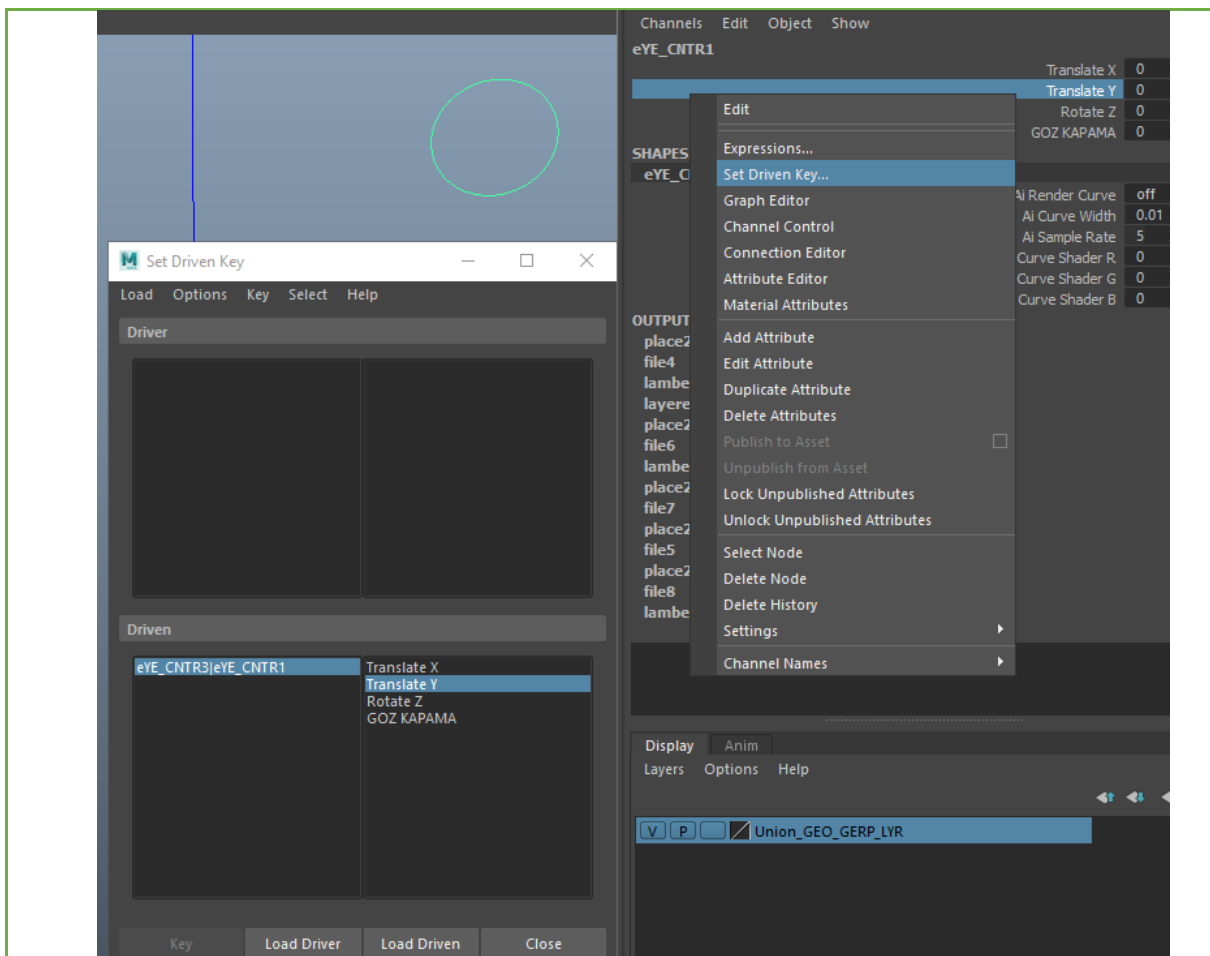
We check whether the eye picture we addressed appears correctly from the viewport by looking at the 6 key.



Visual 3. Addressing pictures to the assigned material

After defining the material to the eye object and addressing the picture, the students are told that the control object's movement, up and down, right and left, should be linked to the coordinates of the picture we assign, and that the animator should be able to revive the character's eye by moving the control object up and down.

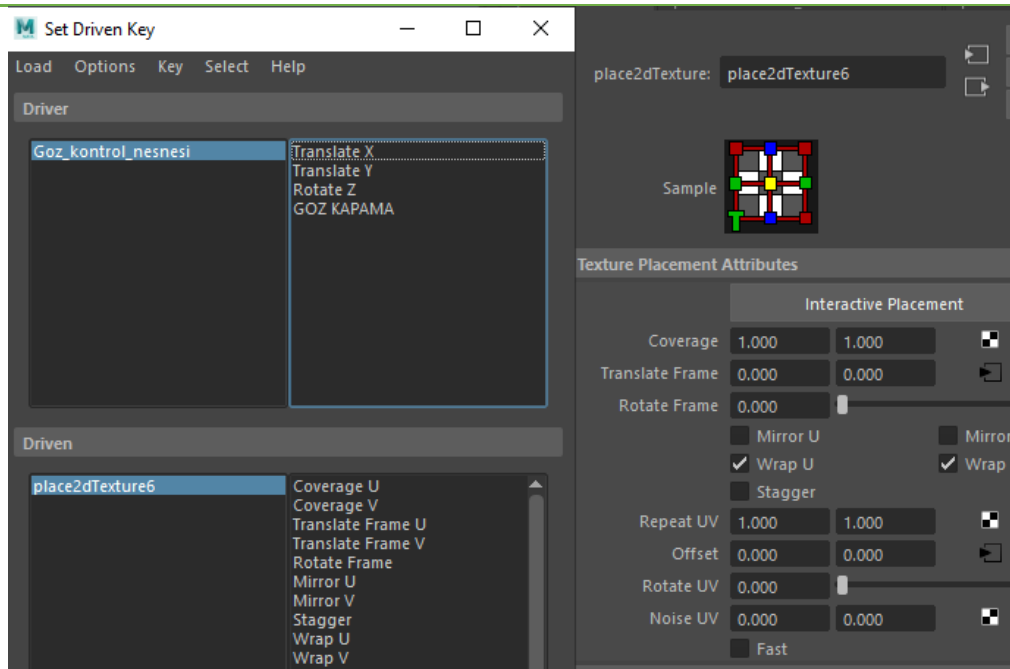
They are asked to open the set drivenkey (feature binding panel) panel by selecting the control object and right clicking the "translate y" command from the channelbox panel with the CTRL command.



Visual 4. Set driven panel

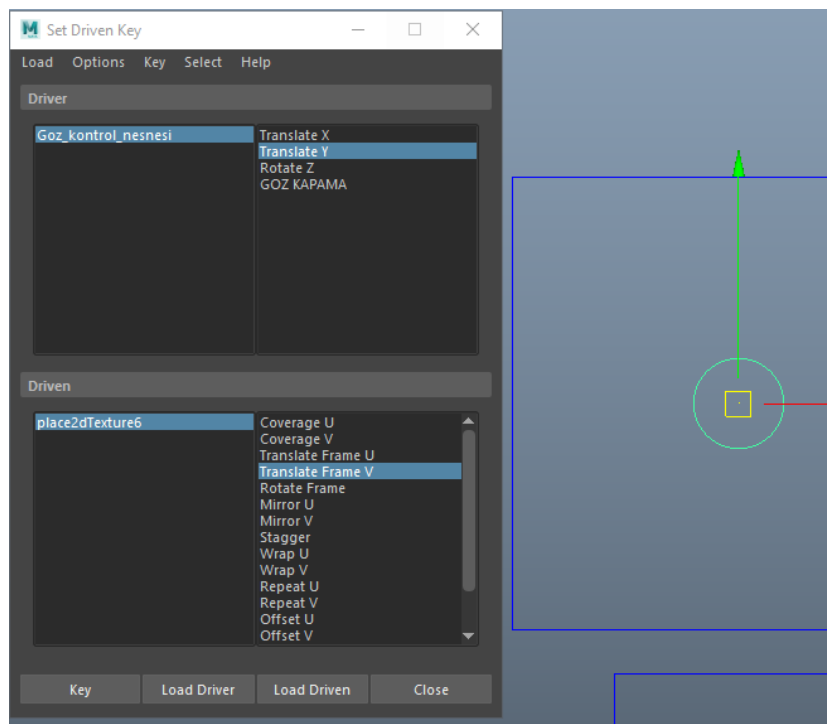
After the set drivenkey panel is opened, we select the control object and click the loaddriver button on the panel, we add the control object to the driver part, and then we select the 3d object and open the attribute panel. By selecting the material we have previously assigned from the opened panel, we click on the arrow with the “uvCoordinates” tab from the color panel, which comes to the previously assigned eye picture tab.

At this stage, we click on the “loaddriven” section in the set driven panel using the selector from the last opened panel. Thus, we define the necessary objects to the driver and driven part of the SET DRIVEN panel.



Visual 5. Set driven panel object loading

In the current step, we first select both movements from the set drivenkey panel to connect the translate y motion, which is one of the required control object movements in the right columns in the Set drivenkey panel, to the TranslateFrame V motion in the lower column.



Visual 6. Set driven panel motion selection

After selecting the movements, we press the key button on the Set driven panel. Then, we pull the control object down by 1 unit in the y axis and 1 unit in the translate Frame V movement, by pushing the key again, when we move the control object down, we ensure that it moves down in the eye picture. We apply this version of the translateFrame U-axis with the x-axis instead of just the y-axis so that the eye picture on the character can move left and right.

Thus, we have completed the movement binding phase with set drivenkey, which is a simple procedure.

1. After the projection device is turned on and connected to the PC, students;

It is stated verbally that we need to link the eye picture for the correct eye gestures and movements with the control object features, which is one of the stages required for face rigging in VR, and then;

Students are asked to watch the video opened on the projector and take notes;

- The instructions in the video are taken into consideration by watching the video titled “Creating the motion link of the eye picture in the control object properties in the EK_7_A_VR environment” in the supplementary files.

- While watching the video, it is asked whether there is a question in VR environment that they cannot understand or want to ask about “creating the motion link of the eye picture with the control object properties” compared to the traditional PC environment; Depending on the feedback, the parts described in the video can be explained and explained again.

2. After watching the video “Creating the motion link of the eye picture with the control object properties in EK_7_A_VR environment”, the students are asked to apply individually on the VR device;

- After the video presentation, from the students; By wearing the VR cap, they are asked to perform the applications described in the video individually in the Autodesk maya program.

- The PC screen image used for viewing the experience of the students watching during this application is reflected on the projection and the students who experience the title can be verbally helped about the application.

3. After the students have been implemented the phase of “Creating the motion link to the eye picture with the control object properties in EK_7_A_VR environment” in VR environment;

- The student is asked to compare “Control object and movement link to eye picture” application according to their experiences in the PC environment, and to interpret the advantages and disadvantages of producing 3D content with VR.

MIDTERM (8. WEEK)

NAME OF THE EVENT: MIDTERM EXAM

OBJECTIVE: To enable students to evaluate the facial rigging stages they have learned for 7 weeks as a whole and to see the advantages and disadvantages compared to the PC environment.

LEARNING OUTPUT: students;

- "In the virtual reality environment, they realize the advantages and disadvantages of the use of 3d software tools in traditional methods, by individually experimenting at the "FACE RIG" production level.

MATERIAL:

Projector

Internet connection

1 Oculusrift hardware (4 batteries AA size)

1 pc with sufficient hardware,

A class space sufficient (2x2 meters) wide to use Oculusrift

DURATION: 150 mins(3 hours).

EXAM APPLICATION:

1. The projector is turned on and after connecting to the PC, students;

According to the number of VR equipment of the application method of the exam, the models and pictures that were prepared by everyone individually in order;

- What you learned in MARUI INTERFACE USE in Autodesk maya program
- What you learned at the PROJECT MANAGEMENT stage
- What you learn during the CONTROL objects creation and feature creation phase
- Practice what they have learned during picture assignment and movement linking.
- By testing these steps, they are said to test that the result is correct.

1. 1. Then, students are told the evaluation criterias;

- During the exam, how well the commands and applications previously taught will be evaluated will be evaluated.
- To evaluate how fluently they use the hardware when making applications.
- When they test their stages as the final evaluation criteria, it is said how accurate the result will be evaluated;

MIDTERM (9. WEEK)

NAME OF THE EVENT: MIDTERM EXAM

OBJECTIVE: To enable students to evaluate the facial rigging stages they have learned for 7 weeks as a whole and to see the advantages and disadvantages compared to the PC environment.

LEARNING OUTPUT: students;

- "In the virtual reality environment, they realize the advantages and disadvantages of the use of 3d software tools in traditional methods, by individually experimenting at the "FACE RIG" production level.

MATERIAL:

Projector

Internet connection

1 Oculusrift hardware (4 batteries AA size)

1 pc with sufficient hardware,

A class space sufficient (2x2 meters) wide to use Oculusrift

DURATION: 150 mins(3 hours).

EXAM APPLICATION:

1. The projector is turned on and after connecting to the PC, students;

According to the number of VR equipment of the application method of the exam, the models and pictures that were prepared by everyone individually in order;

- What you learned in MARUI INTERFACE USE in Autodesk maya program
- What you learned at the PROJECT MANAGEMENT stage
- What you learn during the CONTROL objects creation and feature creation phase
- Practice what they have learned during picture assignment and movement linking.
- By testing these steps, they are said to test that the result is correct.

2. Then, students are told the evaluation criterias;

- During the exam, how well the commands and applications previously taught will be evaluated will be evaluated.
- To evaluate how fluently they use the hardware when making applications.
- When they test their stages as the final evaluation criteria, it is said how accurate the result will be evaluated;

ACTIVITY 10(10. WEEK)

NAME OF THE ACTIVITY: "IMAGINE PICTURE AND MOVEMENT CONNECTION STAGE" in Face Reality Application with Virtual Reality

OBJECTIVE: In the "FACE RIGGING" study in the SG environment, to enable students to comprehend how to link the control object properties with the Mouth picture of the character and how to act.

LEARNING OUTPUT: students;

- Understand how to connect the character's Mouth picture and how to act, with the control object features of the "FACE RIGGING" stages to be performed in the virtual reality environment.
- In the virtual reality environment, they understand the advantages and disadvantages of the use of 3d software tools in traditional methods at the "FACE RIG" production level.

MATERIAL:

Projector

Internet connection

Video Presentations describing the use of software

1 Oculusrift hardware (4 batteries AA size)

1 pc with sufficient hardware,

A class space sufficient (2x2 meters) wide to use Oculusrift

R.6 (PAGE 231-236)

R.5 (CHAPTER 2)

DURATION: 150 mins(3 hours).

PROCEDURE:

Since the content of this course is the same as the content in 7 weeks, instead of the eye control object and eye picture used in the application of 7 weeks, we are told that we should apply the same application with the Mouth control object and mouth pictures for this week, and the 7 week content is applied only for the mouth area with the students. Afterwards, the application made for the mouth is watched from the video narration below.

Students are asked to watch the video opened on the projector and take notes;

- The instructions in the video are taken into consideration by watching the video titled "Creating the motion link of the mouth image to the control object properties in the EK_10_A_VR environment" in the supplementary files.
- While watching the video, it is asked whether there is a question in VR environment that they cannot understand or want to ask about "creating the motion link of the mouth picture with the control object properties" according to the traditional PC environment; Depending on the feedback, the parts described in the video can be explained and explained again.

2. "After watching the video of the connection of the mouth picture with the control object properties in EK_10_A_VR environment, the students are asked to apply individually on the VR device;

- After the video presentation, from the students; By wearing the VR cap, they are asked to perform the applications described in the video individually in the Autodesk MAYA program.
- The PC screen image used for viewing the experience of the students watching during this application is reflected on the projection and the students who experience the title can be verbally helped about the application.

3. After the students have been implemented the phase of "Linking the motion picture of the mouth picture with the control object properties in the EK_10_A_VR environment" in VR environment;

- The student is asked to compare the advantages and disadvantages of producing 3D content with VR by asking them to compare "Control object and mouth image to motion link" based on their experience in the pc environment.

ACTIVITY 11(11.WEEK)

NAME OF THE EVENT: "ORAL MIMIC CHANGE COMMAND BINDING STAGE" in the Facial Rigging Application with Virtual Reality "

OBJECTIVE: In the "FACE RIGGING" study in the SG environment, to enable students to comprehend how the character will be linked to the control object with the mouth mimic replacement command.

LEARNING OUTPUT: students;

- Understand how to connect the character's Mouth gesture change command with the control object, which is one of the "FACE RIGGING" stages to be done in the virtual reality environment.
- In the virtual reality environment, they understand the advantages and disadvantages of the use of 3d software tools in traditional methods at the "FACE RIG" production level.

MATERIAL:

Projector

Internet connection

Video Presentations describing the use of software

1 Oculusrift hardware (4 batteries AA size)

1 pc with sufficient hardware,

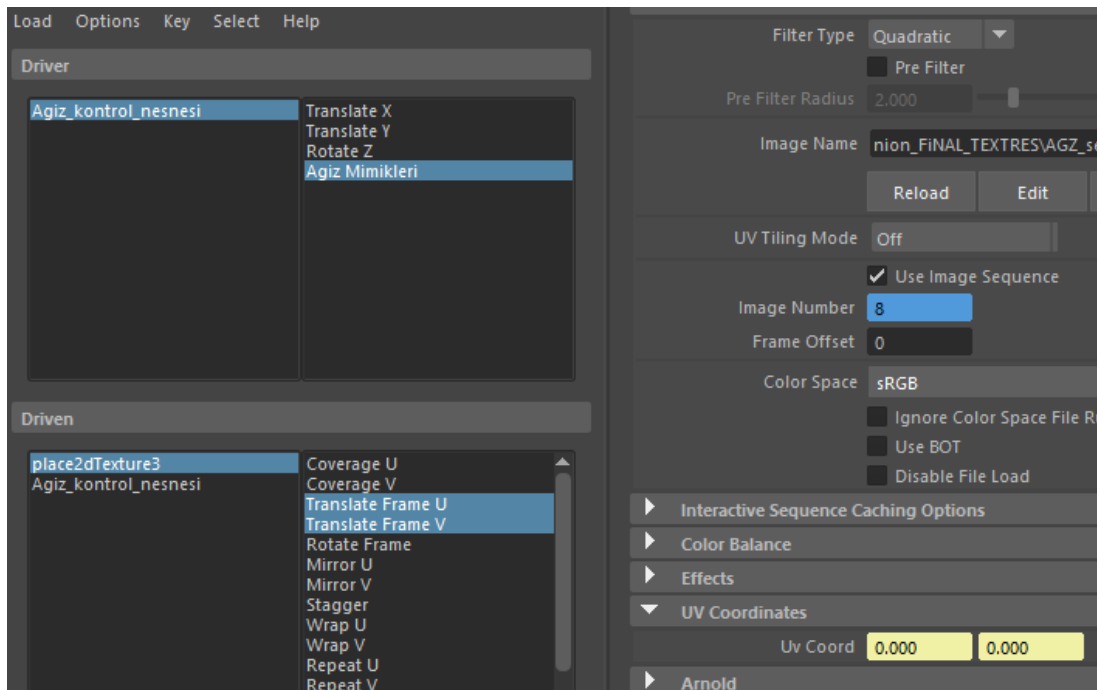
A class space sufficient (2x2 meters) wide to use Oculusrift

R.6 (PAGE 393-418)

DURATION: 150 mins(3 hours).

PROCEDURE:

In this course, students are told that we need to make mouth and eye gestures in the character of the mouth and eye that we have previously created, whose movements are connected to the control object, so that the animators can perform the necessary animation (sad mouth smiley mouth, etc.) and then the application is made according to the following order and then it is applied with a video narration.



Visual 1. Mouth gestures SDK panel connection

In the mouth control object that we have previously assigned to students, it is said that in order to change between different mimics, the driver section should be assigned to the driver part in the set drivenkey panel, then the set drivenkey panel is required to change between different mimics. The

uvcoordinates panel in the picture assigned to the mouth part of the driven part is said to be assigned with the select command.

Finally, it is said that in the features of the mouth control object that the mouth gestures are selected on the right side of the Set drivenkey panel, the TranslateFrame U and V features should be selected.

After this selection is made as in the above image, the first mimic is selected from the mimics in the mouth control object and key key is pressed in the SDK panel. Then, in the mouth control object, the next mimic is selected from the mouth mimics (laugh, sadness, etc.), by setting the TranslateFrame U and V parameters to the required position, the second mimic is displayed in the mouth of the character and the key is pressed again. This process should be repeated for all mimics in the mouth control object.

After these processes are applied for all mouth gestures, the mimics are tested by selecting the mouth control object and switching to different mimics one by one.



Visual 2. Mouth gestures test

Students are asked to watch the video opened on the projector and take notes;

- The instructions in the video are watched by watching the video titled “Creating the link of the control object and the mouth gesture change command in the EK_11_A_VR environment” in the supplementary files.
- While watching the video, it is asked whether there is a question that they cannot understand or want to ask about “creating the connection of control object and mouth gesture change command” in VR environment compared to Traditional PC environment; Depending on the feedback, the parts described in the video can be explained and explained again.

2. “Creating the connection between the control object and mouth mimic switch command in the EK_11_A_VR environment”, the students are asked to apply individually on the VR device;

- After the video presentation, from the students; By wearing the VR cap, they are asked to perform the applications described in the video individually in the Autodesk maya program.
- The PC screen image used for viewing the experience of the students watching during this application is reflected on the projection and the students who experience the title can be verbally helped about the application.

3. After the students have the “Create control object mouth gesture change link in EK_11_A_VR environment” phase in VR environment;

- The student is asked to compare the advantages and disadvantages of producing 3D content with VR by asking them to compare the "control object mouth gesture change connection" application according to their experience in the pc environment.

ACTIVITY 12(12. WEEK)

NAME OF THE ACTIVITY: "EYE MIMIC CHANGE COMMAND BINDING STAGE" in Virtual Reality Face Rigging Application

OBJECTIVE: In the "FACE RIGGING" study in the SG environment, to enable students to comprehend how to connect the control object with the Eye mimic command of the character.

LEARNING OUTPUT: students;

- Understand how to connect the character's Eye gesture change command with the control object, which is one of the "FACE RIGGING" stages to be done in the virtual reality environment.
- In the virtual reality environment, they understand the advantages and disadvantages of the use of 3d software tools in traditional methods at the "FACE RIG" production level.

MATERIAL:

Projector

Internet connection

Video Presentations describing the use of software

1 Oculusrift hardware (4 batteries AA size)

1 pc with sufficient hardware,

A class space sufficient (2x2 meters) wide to use Oculusrift

R.3 Maya-GENEL_KULLANIM_

R.4 Art of Maya

R.6 (PAGE 393-418)

DURATION: 150 mins(3 hours).

PROCEDURE:

Since the content of this course is the same as the content in the 11th week, instead of the mouth control object and mouth image used in the application of the 11th week, we are told that we should apply the same application with the eye control object and eye pictures for this week, and the content of the 11th week is applied only for the eye area. Afterwards, the application made for the eye is watched from the video description below.

1. Students are asked to watch the video opened on the projector and take notes;

- The instructions in the video are watched by watching the video titled "**Creating the link between the control object and the mouth gesture change command in EK_11_A_VR environment**" in the supplementary files.
- While watching the video, it is asked whether there is a question they want to ask about "**creating the connection of control object and mouth gesture change command**" in VR environment compared to the traditional PC environment; Depending on the feedback, the parts described in the video can be explained and explained again.

2. After watching the video "Creating the connection of control object and mouth mimic switch command in EK_11_A_VR environment", the students are asked to apply individually on the VR device;

- After the video presentation, from the students; By wearing the VR cap, they are asked to perform the applications described in the video individually in the Autodesk MAYA program.
- The PC screen image used for viewing the experience of the students watching during this application is reflected on the projection and the students who experience the title can be verbally helped about the application.

3. After the students have the "Create control object mouth gesture change link connection in EK_11_A_VR environment" phase in VR environment;

- The student is asked to compare the control object's mouth gesture change application according to their experiences in the PC environment and to interpret the advantages and disadvantages of producing 3D content with VR.

ACTIVITY 13(13. WEEK)

ACTIVITY NAME: "GROUPING AND NAMING STAGE BY CREATING MASTER CONTROL"

OBJECTIVE: To provide students to comprehend how to do "MASTER CONTROL CREATION AND GROUPING NAMEING" stage in "FACE RIGGING" study in SG environment.

LEARNING OUTPUT: students;

- Comprehend the "master control and grouping naming phase" which is one of the "FACE RIGGING" phases to be carried out in the virtual reality environment.
- In the virtual reality environment, they understand the advantages and disadvantages of the use of 3d software tools in traditional methods at the "FACE RIG" production level.

MATERIAL:

Projector

Internet connection

Video Presentations describing the use of software

1 Oculusrift hardware (4 batteries AA size)

1 pc with sufficient hardware,

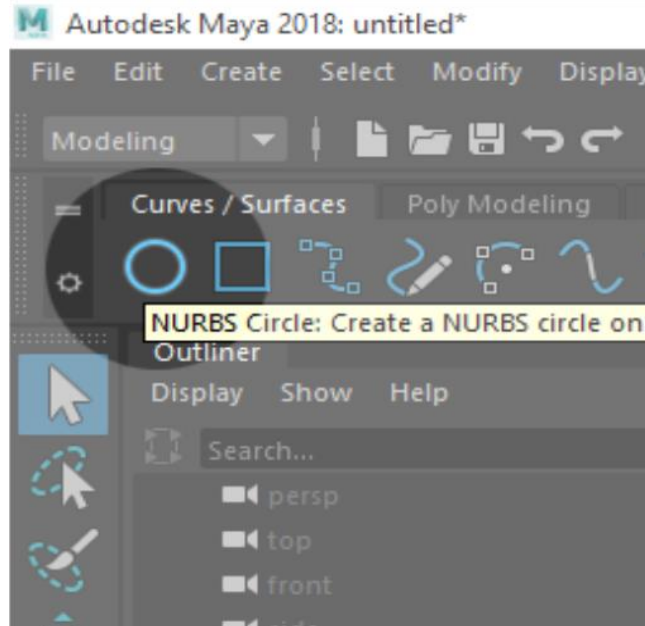
**A class space sufficient (2x2 meters) wide to use Oculusrift
R.5 (CHAPTER 2)**

DURATION: 150 mins(3 hours).

PROCEDURE:

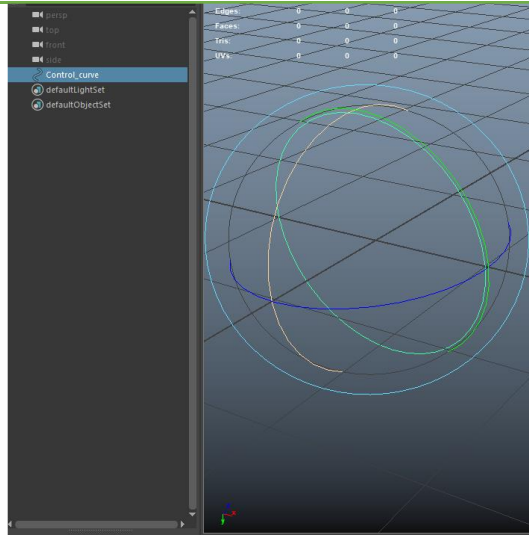
After completing the character's face rig, students are told that the animators should put the main control on the character in order to take the character to the difference and make it possible, except for the face controls, and narrate in the following order;

In the maya program we are told that we need to create a control object and this object should be curve, and in the image below, we are told that we need to create **the main control object with the CreateCurve command.**

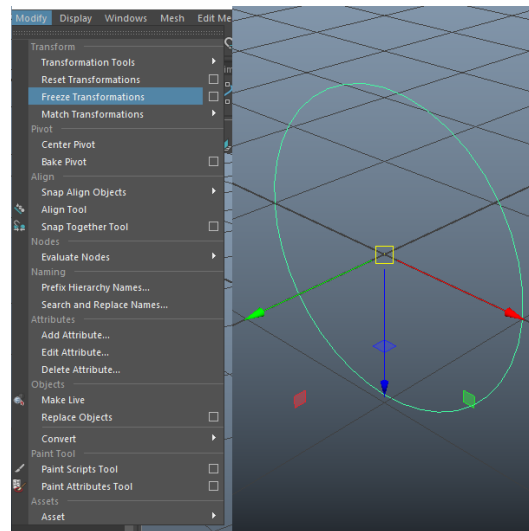


Visual 1.Maya CreateCurve

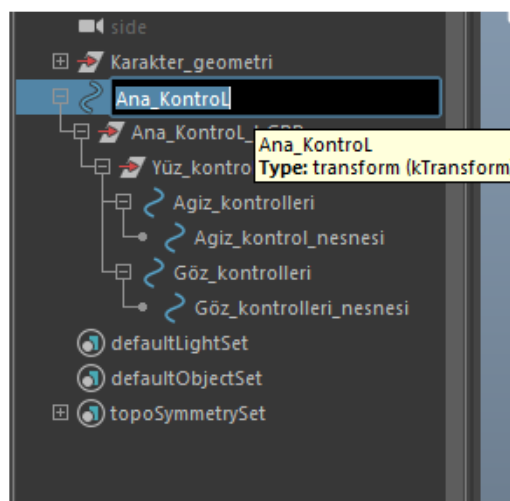
Then we are told that we have to translate the created control curve in 90 degrees x axis and name it as the **MAIN CONTROL** and apply the freeze transform command.



Visual 2.Rotate curve – renamecurve



Visual 3.Freeze transform



Visual 4.Naming

Then, it is said that they should sort this control object and the control objects created for mouth and eye in previous lessons by opening the Outliner (tray) panel according to the order in the image below, by grouping, dragging and dropping with ctrl-g.



Visual 5.Outliner panel

As the last step, the **MAIN CONTROL** object created for the character is selected and the **MAIN CONTROL** object is tested by moving the character to different positions in the maya viewport (Program screen). The situation to be observed during this test is that when carrying the character, any object does not go to different places and the eye and mouth pictures remain deformed in their original appearance.

Students are asked to watch the video in the materials and take notes;

- The video titled “EK_13_A_VR environment, Master control creation and grouping naming stage” is watched and the instructions in the video are taken into consideration.
- While watching the video, it is asked whether there is a question that they cannot understand or want to ask about “Master control creation and grouping naming stage” in VR environment compared to Traditional PC environment; Depending on the feedback, the parts described in the video can be explained and explained again.

2. “After EK_13_A_VR environment Master control creation and grouping naming phase” video is watched, students are asked to apply individually on VR device;

- After the video presentation, from the students; By wearing the VR cap, they are asked to perform the applications described in the video individually in the Autodesk maya program.
- The PC screen image used for viewing the experience of the students watching during this application is reflected on the projection and the students who experience the title can be verbally helped about the application.

3. After the students have the “EK_13_A_VR Master control creation and grouping naming stage” phase in VR environment;

- The student is asked to compare the advantages and disadvantages of producing 3D content with VR by comparing the “Master control creation and grouping naming stage” application according to their experience in the pc environment.

ACTIVITY 14(14. WEEK)

NAME OF THE ACTIVITY: "SQUASH DEFORMING PROPERTY ATTACHMENT STAGE" in Virtual Reality Face Rigging Application "

OBJECTIVE: To provide students to comprehend how to do "SQUASH DEFORMING FEATURE ATTACHMENT STAGE" in "FACE RIGGING" study in SG environment.

LEARNING OUTPUT: students;

- Comprehend the **"squash deform feature assignment phase"** which is one of the **"FACE RIGGING"** phases to be performed in the virtual reality environment.
- In the virtual reality environment, they understand the advantages and disadvantages of the use of 3d software tools in traditional methods at the **"FACE RIG"** production level.

MATERIAL:

Projector

Internet connection

Video Presentations describing the use of software

1 Oculusrift hardware (4 batteries AA size)

1 pc with sufficient hardware,

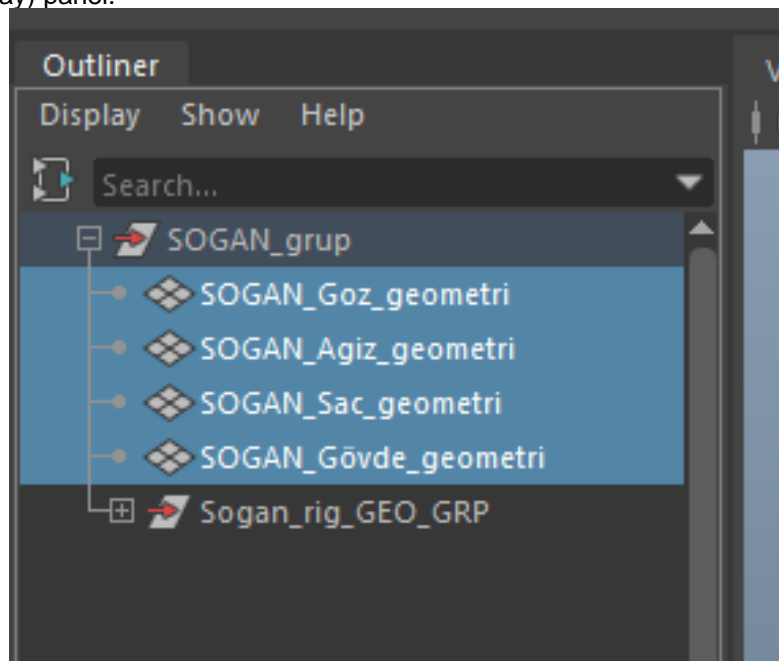
A class space sufficient (2x2 meters) wide to use Oculusrift
R.5 (CHAPTER 6 PAGE 298-301)

DURATION: 150 mins(3 hours).

PROCEDURE:

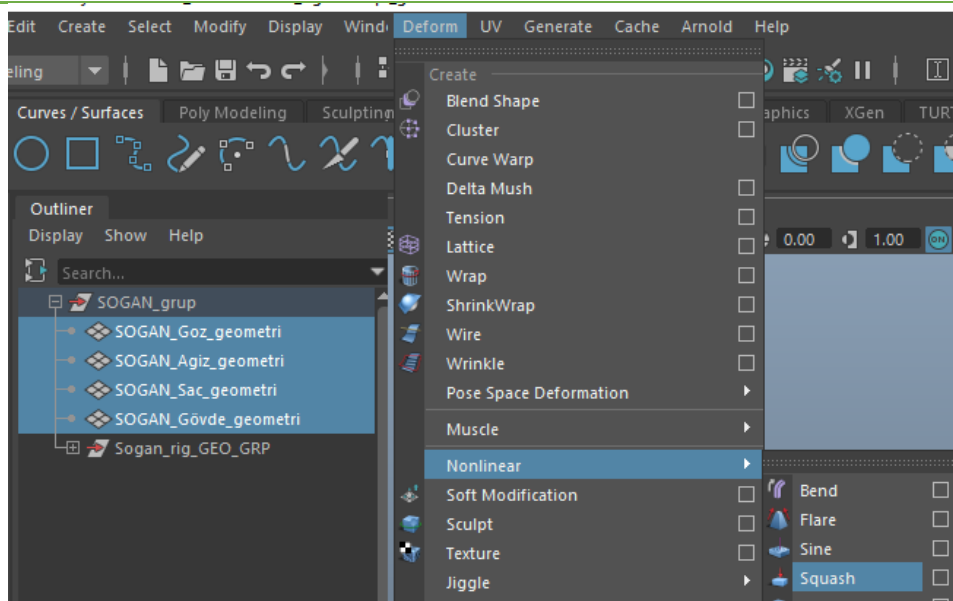
After the completion of the character's mouth, eye and Main controls, students are told that adding a squashdeformer feature will be effective in animators' ability to portray the character with a higher quality and give more convincing poses.

First, it is said that all the polygon geometry of the character should be selected by opening the outliner (tray) panel.



Visual 1.Outline geometry selection

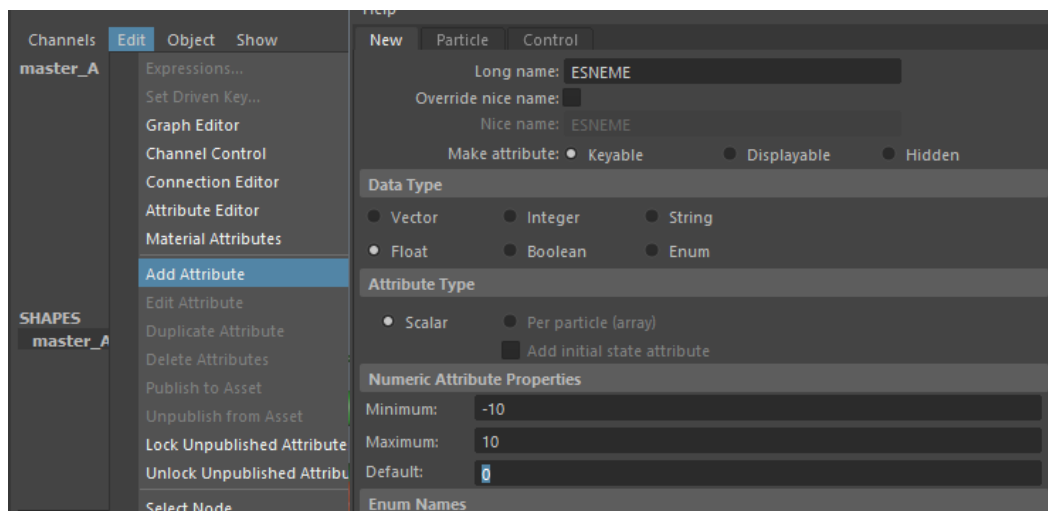
Then, as shown in the image below, while the entire geometry is selected, click on the "SquashDeformer" tab in the Maya Deform menu.



Visual 2.Squash (stretching) deformer joint

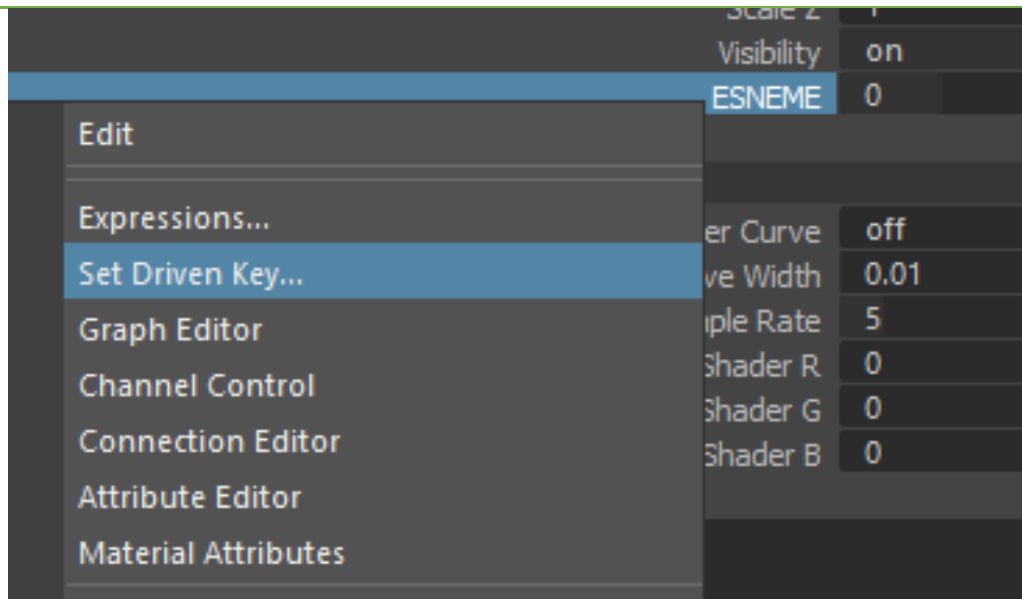
After this application, we added squashdeformer to the character. But now we need to assign a feature named yawn in the MAIN Control object and connect it to this deformer in order to enable the animators to use this deformer according to their own wishes. For this, respectively;

The MAIN Control object is selected and a feature named yawning is assigned to the panel opened by clicking addattribute from the property pane in the settings below.



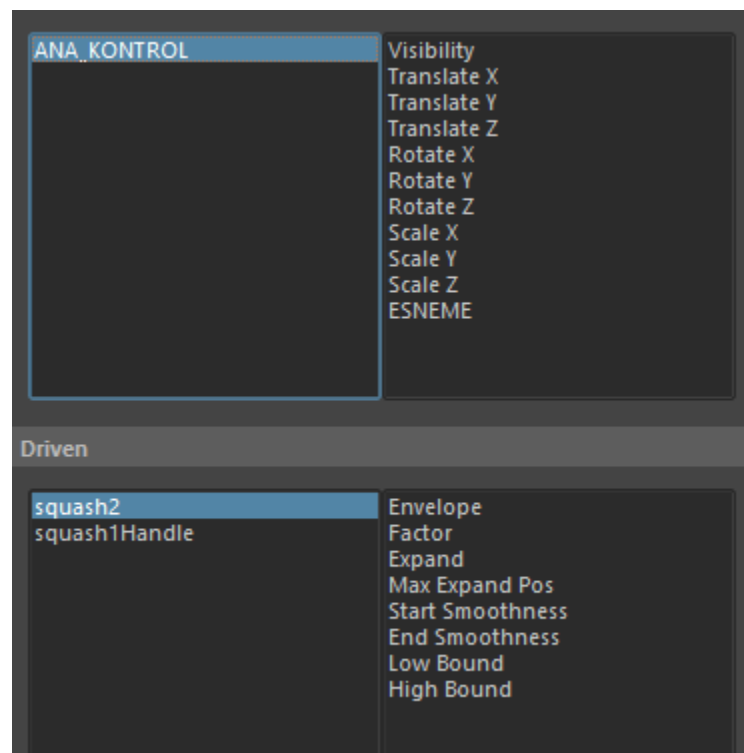
Visual 3. Assigning properties to the main control

After assigning this property to the main Control object, we need to link the stretching effect to the stretching feature. To do this, the main control is selected first and the Setdrivenkey panel is opened with the ctrl right click command from the feature panel.



Visual 4.Set drivenkey board

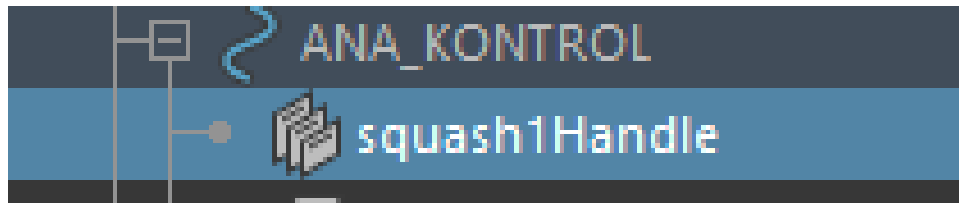
After the set drivenkey panel is opened, the “squash1” object we created from the outliner panel is selected and the flexing deformer object is loaded to the Clipboard by clicking the driven button in the Set drivenkey panel.



Visual 5.Set drivenkey board

Then, before the columns on the right side of the Set drivenkey board, yawn, then Factor features are selected and the key button is pressed. Thus, we can fix the yawn object in the character to the "0" position when the yawn property is in the "0" position. Now put the yawn feature to the "10" position, put it in the factor feature to 1 and press the key button again. The same process repetition feature is repeated as “-10” and factor factor is -1.

Finally, by dragging the "squash1Handle" object from the outliner (tray) panel, we moved it under the main control object, so that the character can continue to flex in different positions.



Visual 6. Set drivenkey board

Students are asked to watch the video opened on the projector and take notes;

- The video titled "EK_14_A_VR environment assigning the stage of squash deforming feature" in the supplementary files is watched and the instructions in the video are taken into consideration.
- While watching the video, it is asked whether there is a question they want to ask about the "squash deforming stage" stage in VR environment compared to the traditional PC environment; Depending on the feedback, the parts described in the video can be explained and explained again.

2. "In the EK_14_A_VR environment, the stage of assigning squash deform feature "after watching the video, students are asked to apply individually on the vr device;

- After the video presentation, from the students; By wearing the VR cap, they are asked to perform the applications described in the video individually in the Autodesk MAYA program.
- The PC screen image used for viewing the experience of the students watching during this application is reflected on the projection and the students who experience the title can be verbally helped about the application..

3. After the students have "EK_14_A_VR squash deform feature assignment phase" applied in VR environment;

- The student is asked to compare the advantages of the "squash deforming feature assignment" application according to their experience in the PC environment and to interpret the advantages and disadvantages of producing 3D content with VR.

ACTIVITY 15(15. WEEK)

NAME OF THE ACTIVITY: “RIGGING TEST STAGE PROCESS” in Virtual Reality and Face Rigging Application ”

OBJECTIVE: To enable students to test their facial rig in SG environment by keying them.

LEARNING OUTPUT: students;

- Understand how to test the face rigynopause they produce in virtual reality environment.
- In the virtual reality environment, they understand the advantages and disadvantages of the use of 3d software tools in traditional methods at the “FACE RIG” production level.

MATERIAL:

Projector

Internet connection

Video Presentations describing the use of software

1 Oculusrift hardware (4 batteries AA size)

1 pc with sufficient hardware,

A class space sufficient (2x2 meters) wide to use Oculusrift

R.6 (CHAPTER 6)

DURATION: 150 mins(3 hours).

PROCEDURE:

In this lesson, students are asked to test the character they have created their facial rig with simple poses and select different options in the control objects to test for any malfunctions in the rig. Then, how they should test the character is explained in the following order;

After the character is called to the stage, the Main control is selected and keyed (fixed) by pressing the "S" key while in the "0" position. After keying, it is taken to a different location and keyed again. The bucking process can be done in 5-10 different numbers. Then the play button is pressed. When changing the character position on the stage, an unexpected disorder is observed in the character's structure and mouth-eye pictures. If there is a deterioration, corrections are made by returning to the rigging stages.

The keying process described above is repeated within the mouth control, eye control and squash control and the play key is checked for any abnormal deformations by pressing the play button. If a malfunction occurs, the content of the previously processed topics is repeated.

As a result of these tests, if the character changes its position as desired and changes the mouth and eye gestures correctly, all the keys created in the Character are deleted and the Character is saved as a New Maya scene.

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