The First World Vocational College Skills Competition Virtual Reality (VR) Design and Production Competition Questions

Urban Rail Transit Operation Scenario Simulation Design and Production

I. Intention

Urban Rail Transit Operation Scenario Simulation Design and Production simulates the routine real operations and functions of subway rail operations for the purpose of simulating and learning the operation process of urban rail transit.

II. Situation Creation

With the acceleration of the urban construction process, the urban rail transit is becoming increasingly developed, and more and more countries intend to carry out related infrastructure construction. VR training courses are designed to quickly cultivate rail operation talents for countries under urban rail transit infrastructure construction. The story goes like this: In order to meet the requirements for the post, an urban rail transit station staff conducts a simulation and training on the station opening process in the urban rail operation as the pre-job training in the form of VR.

III. Task Design

Question description: Open the reference file of Urban Rail Transit Operation in the specified directory of the USB flash disk, carefully study the file and complete, in accordance with the requirements for TP, the four modules of VR project design, VR model production, VR engine production, and motion interactive production which can be operated on specified equipment.

Module 1: VR project design

1.1 Use VR to design an urban rail transit scenario to show the convenience brought by urban rail transit. VR project proposals are now solicited from the public. Please complete the VR project proposal design of "Urban Rail Transit Operation".

● Main scenario, main character design plan (including scenario style and character design)

● Interactive function design (including description of interaction mode and trigger mode)

● Interface interaction design, represented by wireframes

● Project VR hardware implementation mode and reason

● Video recording of project design process, in the form of MP4, with the size not exceeding 500 M

Requirements for project design document: All documents should be provided in the form of PDF. Competitors should design the project in a combination of text and graphics, express the intention of the design as clearly as possible to the program, art, and interface designers.

1.2 Marking criteria

No.	Marking indicators	Marks
1	Main scenario, main character design plan	4
2	Interactive function design (including description of interaction mode and trigger mode)	5
3	Interface interaction design, represented by wireframes	4
4	Project VR hardware implementation mode and reason	4
5	Video on project design and production process	3

Module 2: VR model production

Make subway vehicle models, subway station platform scenario models, and male passenger models.

2.1 A set of passenger room model of Trailer Car No. 1 (TC-1)

Complete the subway vehicle model production with reference to the photos and three-view drawing provided.

(1) Three-view reference picture.

(2) Multi-angle footage of the interior of the TC-1

(3) The overall structure refers to that of the passenger room in TC-1

2.2 A set of scenario models of the platform on one side of the subway station

Complete the production of the platform scenario model on one side of the subway station with reference to the photos provided.

(1) CAD drawings and multi-angle pictures of the platform on one side of the subway station.

(2) Picture of platform screen doors, escalators and elevators.

(3) Reusable textures for walls and floors.

2.3 One male passenger model

Complete the production of a male passenger model with reference to the photos provided.

(1) Male passenger clothing photo.

(2) Male passenger facial texture.

(3) Male passenger side view

2.4 Requirements:

(1) Name, save location and format meet the requirements

(2) The scale is accurate

(3) The wiring is reasonable

(4) The material details are realistic

(5) The split of UV unfolding is reasonable and textures are beautiful

(6) The number of model faces is reasonable

(7) The lighting and atmosphere are proper

(8) The overall effect is beautiful

2.5 Marking criteria (Multiple models will be marked according to this marking ratio):

No.	First-level indicators of marking criteria	Second-level indicators of marking criteria	Marks
1	Basic Requirements	Name, save location and format meet the requirements	3
2	Proportion	Accurate	3
3	Wiring	Regular, with proper density	4
4	UV split	Reasonable	5
5	Material texture	Beautiful, realistic and logical	3
6	Number of model faces	Reduce the number of faces in the case of ensuring that the silhouette outline is not deformed	5
7	Light	In line with real-world logic and realistic atmosphere	3
8	Overall effect	Beautiful	4

Module 3: VR engine production

3.1 Enter the scenario. Make a subway entrance with the door closed appear in front of me, and make the picture gradually become brighter; at the same time, make a subtitle that "I came to the subway entrance at 7:00 a.m. and start my busy day" appear gradually. Five seconds delayed after the subtitle is played. Highlight the gate of the subway entrance, and switch the scenario by operating the equipment to interact with the highlighted gate.

3.2 Switch the scenario. I appear in the platform in front of the platform screen door at the moment. Make the text prompt box "Check the platform screen door" automatically pop up, and highlight three keys on the ground. Use the operating equipment to grab the three keys and insert them into the key hole of the screen door. Make only the middle key can start the screen door. After the start, make the screen door open and close. The

task is completed. Make a pop-up window in the screen prompt "Check all screen doors according to the indicated path". Realize movement and teleportation after clicking the "OK" button in the window. At this time, move through the door by using the operating equipment in the specified order; give an alarm signal at the same time when the order is wrong, and return to the initial position and move again.

3.3 Switch the scenario. I appear next to the elevator. Make a pop-up window in the screen prompt "Use the elevator to go to the station hall"; make the elevator door open automatically; make the elevator door automatically closed when I enter the elevator. Make the exterior scene change from the platform to the station hall seen through the elevator glass during the elevator's ascent. Make the scenario switch when the elevator door opens.

3.4 I appear in front of the security door of the car control room. Click the password lock by using the operating equipment, and make a password input interface pop up. Use the operating equipment to click the number button to enter the password and click "Confirm" (The password is 1234.). Make a password error prompt pop up if the password is wrong. Make the scenario switch after the door of the car control room opens automatically if the password is right.

3.5 I enter the car control room. Make the lights in the car control room automatically turned on. Make the prompt subtitle "Please check the surrounding environment and wait for the passenger to enter the designated location" appear in front of the screen. Look around the surroundings, I return to the computer screen in the car control room after I see the male passenger in the distant compartment enter and sit down. Highlight the computer screen. After focusing on the computer screen for 2 seconds, the computer screen in the car control room will show a boot animation. Highlight the computer screen after the animation is played. Use the operating equipment to click the computer screen, and make the computer screen automatically move and zoom in the computer screen.

3.6 I drag and drop different equipment icons on the computer screen to the designated positions to start the station equipment. Make the icons flicker after all the drag and drop are correct. At this time, make the text "BAS system is running normally, FAS equipment is running normally, AFC equipment is running normally, and the station opening operation has been completed" appear upwards from the bottom of the lens. After the subtitles are played, the software automatically exits.

3.7 Export the executable file, run it on the VR workstation equipment, adjust the material and code according to the running result, and complete the project requirements. At the same time, save the packaged compressed file "Urban Rail Transit Operation.rar" or "Urban Rail Transit Operation.zip" in the "Submission Document\Module 3\Result File\" of USB flash disk as the marking basis.

3.8 Marking criteria

No.	Marking criteria	Marks
1	Realize Function 3.1	3
2	Realize Function 3.2	6
3	Realize Function 3.3	3
4	Realize Function 3.4	2
5	Realize Function 3.5	3

6	Realize Function 3.6	5
7	Realize Function 3.7	5
8	Overall effect	3

Module 4: Motion interaction production

4.1 Complete model binding, animation production, rendering and compositing according to the animation examples provided and output dynamic video files as required. (Competitors who are required to use MAYA for binding cannot use the automatic binding function, and they should record the screen of the entire binding process.)

4.2 Marking criteria

No.	First-level indicators of marking criteria	Second-level indicators of marking criteria	Marks
1	Basic Requirements	Name, save location and format meet the requirements	2
2	Bone binding	The joint controller is scientific and standardized, and the motion controller conforms to the physiological structure of the character	5
3	Skin	The skin is made completely, and the movement of the model is not damaged	4
4	Action	Accuracy, rhythm, fit of motion law	7
5	Overall effect	Fluency and beauty	2