Test Project

Industrial Design Technology

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Contents

Introduction to Test Project

This Test Project proposal consists of the following documentation/files:

1. WSL2024_TP_Appendix1.pdf

2. WSL2024_TP_Appendix2.pdf

This Test Project proposal consists of the following folders:

1. Environment (Pictures for user scenario rendering in module 3)

2. Background Music (Music files for video editing in module 5)

Introduction

A Swiss company founded in 1981, focused on innovation and quality. It designs products and experiences that have an everyday place in people's lives. Their products focus on how customers connect and interact with the digital world. They keep design at the center to create truly unique and meaningful experiences. With products sold in almost every country in the world, the company brings people together through music, gaming, streaming, video and computing.

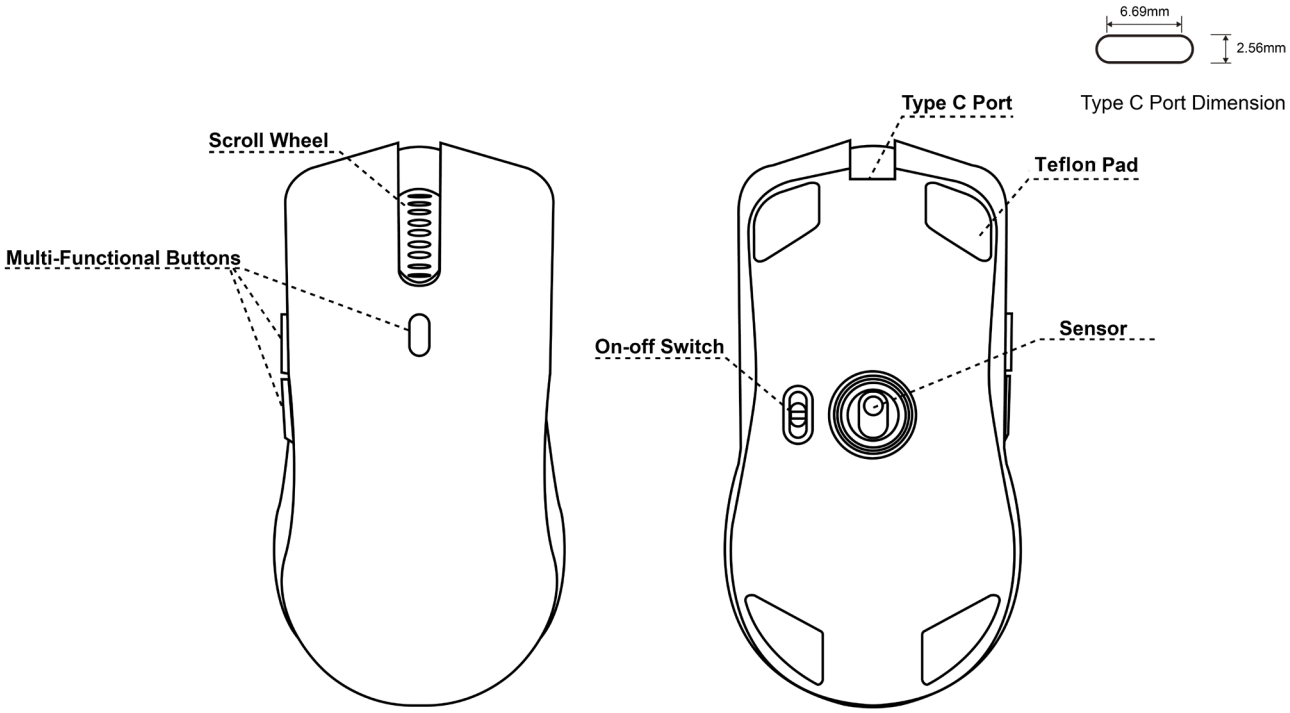
The vision of the company is to enrich people's lives and meet their needs through innovative, reliable, easy-to-use, high-quality products. With a wide range of product lines including peripheral products such as mice, keyboards, webcams, and headsets, it aims to meet the needs of different types of users.

The company's products typically adopt a streamlined design and minimalistic color schemes, giving a modern and high-tech feel. Additionally, the product designs also focus on details such as ergonomics, material selection, and manufacturing processes to ensure product quality and durability.

Now the company is primarily focused on the gaming market, and strives to offer a well-designed wireless gaming mouse to occupy a larger market share. You are a designer in this company, and the specific design requirements are as below:

1. The mouse is designed for young gamers who require high performance and customization for their gaming experience.
2. Ergonomic shape that provides maximum comfort and grip for gaming sessions.
3. Multiple programmable buttons for easy access to more game commands (at least three multi-functional buttons for the settings).
4. LED lighting for status display and personalized gaming experience.
5. High-quality scroll wheel with tactile feedback for quick and accurate scrolling.
6. High-quality sensor that ensures accurate tracking and response on different surfaces.
7. With a type C port for stable connectivity to the computer and battery charging.
8. There is an on-off switch and several Teflon pads at the bottom.
9. The size of the product should not exceed 140x80x45mm (length x width x height).

The previous version is shown as below for your reference, and there are many issues in this type of product, so you need to design a new one to meet all the design requirements.



Product Structure Diagram

Description of project and tasks

Competition Day 1 (7 hours)

Module 1. Design Research (3 hours)

Materials and Tools: A3 and A4 paper, Toolbox for sketching and drawing

Equipment: Workstation, Graphics tablet

Software: Translator, Adobe Photoshop, Autodesk SketchBook

Before starting the product design, you need to conduct a series of design analysis based on the project introduction to help you develop a design strategy and make some concept explorations. You should do the following:

- Brand vision and image analysis
- Market positioning
- User positioning and identification
- User pain point analysis
- Initial solution proposal
- Summarize the conclusions above with a mind-map
- Generate design strategy based on the design analysis
- Explore design concepts by sketches according to the design strategy

Technical parameters of project development:

Brand vision and image analysis described in the mind-map.

1. Market positioning described in the mind-map.
2. User positioning and identification described in the mind-map.
3. At least 1 user pain point described in the mind-map.
4. At least 1 initial proposal described corresponding to the pain point in the mind-map.
5. Design strategy summarizing including appearance, functionality, materials, and user experience described in the mind-map.
6. Design the layout of mind-map and make it more attractive with colors, lines and icons.
7. The image size of the mind-map file is 1920x1080px, in landscape mode, with a resolution of 150dpi, JPG format.
8. At least 3 concept explorations with colors by digital sketching, and each concept sketch should be in accordance with the design strategy and consists of:

- 1 perspective view with colors
- 1 user scenario (shows the interaction with user)

Creates a separate file in Adobe SketchBook for each concept exploration, which is saved in JPG format with a resolution of 1920x1080px, in landscape mode, and 150dpi.

Required files from Module 1:

1. A ".psd"source file named "Mind map", and a JPG file named "Mind map" in your module 1 folder.

2. Three JPG files respectively named "Concept 1", "Concept 2", "Concept 3" in your module 1 folder.

NOTE:

1. Create a folder titled with your participant number on your desktop, and save a folder named "M1_Design Research" in it. Put all module 1 files into the "M1_Design Research" folder.

2. The competitor cannot use internet access during the module 1, and can only use translator to make some descriptions.

Module 2. Concept Design (4 hours)

Materials and tools: A3 and A4 paper, Toolbox for sketching and drawing

Software: Translator

Based on the sketches from module 1, you will choose one of the concepts to develop the details of the product.

You need to submit 3 pieces of A3 paper with sketches to demonstrate every detail of your design.

Technical parameters of project development :

1. The first A3 sheet with sketches should contain the following elements:

- Project name
- A perspective view sketch of the chosen concept, with color and material expression
- Three color schemes proposals for the concept (three small perspective view images)
- The second A3 sheet with sketches should contain the following elements:
- Exploded diagram (separated view) of the object parts with no color
- Marking of each part's name on the exploded diagram
- Selected manufacturing materials for each part and marking of the material name on the exploded diagram
- Three projection views (Front View, Top View, Left Side View) with overall dimensions of the object with no color

2. The third A3 sheet with sketches should contain the following elements:

- At least four scenario sketches with user interaction and color
- Explanations of the functionality on the scenario sketches

Required deliverable for Module 2:

- Three A3 sheets with sketches, and all of the layouts are in landscape format.

NOTE:

1. Clean your table, and keep your workplace tidy after the module work.
2. The Workshop Manager will scan the three A3 sheets and save the scanning copies on your desktop after the module 2. Please write down your participant number at the bottom right corner of the sketches.
3. Create a folder titled with "M2_Concept Design" in the folder named by your participant number on your desktop, and put the three sketch copies in it at the beginning of module 3.

Competition Day 2 (7 hours)

Module 3. CAD Modelling and 3D Printing (7 hours)

Materials and Tools: A3 and A4 paper, Tool box for prototyping

Equipment: Workstation, 3D printer

Software: Translator, Fusion360, 3D printing slicer, Adobe Photoshop

Based on the previously developed results, it is necessary to prepare a three-dimensional model of the product and the corresponding documentation in Fusion 360.

Technical parameters of the 3D model development:

1. Scale of the object's 3D model is 1: 1.
2. Measurement unit of the object is mm.
3. All sketches are determined.
4. Construction using surface and solid modelling tools.
5. All surfaces are sewn and transformed into solids.
6. No breaks in details.
7. The number of parts in the general assembly is at least 3.
8. The "construction tree" is structural integrity, and all part names should be given.
9. No errors in the "construction tree"and the bottom history bar.
10. Presence of text on the model by protrusion or indentation(text: WorldSkills).
11. Fillet for all parts.
12. Thickness of the shells are set, which are not less than 2 mm and not more than 5 mm.
13. Materials and colors are assigned to all parts in accordance with module 2 (select one of the color schemes to express).
14. No overlap in assembly.
15. The types of connections are defined in the general assembly.
16. All datum planes are hidden.
17. Two perspective renderings from different point of view, JPG format, resolution-1920x1080px, file name- "Perspective 1","Perspective 2".
18. Five orthographic renderings, JPG format, resolution-1000x800px, named "Front View", "Top View", "Bottom View", "Left View"and "Right View".

19. Three color variation renderings, JPG format, resolution-1000x800px, file name-"Color Scheme 1", "Color Scheme 2", "Color Scheme 3".
20. Three user scenario renderings with the environment (the environment pictures have been placed in a folder named "Environment" on your desktop), PNG format, resolution-1920x1080px, file name-"Scenario 1", "Scenario 2","Scenario 3". You can use Adobe Photoshop to complete it.
21. One general assembly drawing (orthographic projections, basic view with cross-section, principal dimensions, filled-in title block, and the projection layout referring to the Appendix 1), scale in accordance with the sheet format, file name-"General assembly drawing", A3 landscape mode, PDF format.
22. One exploded drawing with a BOM list (referring to the Appendix 2), scale in accordance with the sheet format, file name "Exploded drawing", A3 landscape mode, PDF format.
23. At least three part drawings (orthographic projections, main dimensions, filled-in title block,and the projection layout referring to the Appendix 1), scale in accordance with the sheet format, file name-"Part_1", "Part_2","Part_3"...., A4 landscape mode, PDF format.
24. Files with the parts ready for 3D printing named"Part 1_Print", "Part 2_Print", etc., with .stl extension, saved in this module folder.
25. 3D printing setup files with .GCode extension, saved in the folder "3D printing".

You will create an animation of the product on the basis of the 3D model, which should reveal the detail design and prepare for the video presentation.

The animation should contain the information as below:

1. Video shots from the camera flying around the object
2. Details of the object demonstration, process at the competitor's discretion
3. Object assembly and disassembly process
4. Motion features demonstration

Note:

1. Please use the WorldSkills drawing template which has been inserted into the Fusion 360 to generate the drawings.

1. The screen resolution of all the animation clips is 1920x1080px, with 72dpi, avi format, named "Clip_1", "Clip_2", "Clip_3".....

Required deliverable for Module 3:

- The general assembly 3D model, with ".f3d" extension
- 2 perspective view renderings
- 5 orthographic renderings
- 3 color variation renderings
- 3 user scenario renderings
- 1 general assembly drawing
- 1 exploded drawing
- 3 part drawings
- A set of files for 3D printing slicing, with .STL extension
- A set of files for 3D printing, with .GCode extension
- At least 2 clips of animations from the camera flying around
- At least 3 design detail animation clips
- 1 object assembly and disassembly animation clip
- At least 3 motion feature animation clips

NOTE:

1. The images of the user scenario environment are located in the"Environment" folder on your desktop.
2. Create a folder named "M3_Technical Process" in your participant number folder, and save all the module 3 files in it.
3. Create a folder named "3D printing" in this module folder, and save 3D printing files.
4. You are allowed to let the 3D printer continue working during the lunchtime, but you will take full responsibility for the result. If the process goes wrong, the Workshop Manager is allowed to stop the 3D printer, but your time will not be extended.

Day 3 (6 hours)

Module 4. Prototyping (3 hours)

Materials and: A3 and A4 paper, Toolbox for prototyping

Equipment: 3D printer

Your task is to continue working on your project and create a prototype of the product. During the

process, you cannot use the computer, and you have to finish the prototype in color within the specified time.

Technical parameters of the prototype development :

1. Prototype made in 1:1 scale.
2. Polishing the 3D printing parts, and painting in color according to the selected concept.
3. Assembling all the parts together.

Required deliverable for Module 4:

1:1 scale prototype

NOTE:

1. After finishing the prototype, please put it on your desk.

2. Clean your table, and keep your workplace tidy after the module work.

Module 5. Design Proposal (3 hours)

Materials and equipment: A3 and A4 paper, Workstation

Software: Translator, Microsoft PowerPoint, Adobe Photoshop, Adobe Premiere Pro

The Competitor should develop a demo video on the basis of the finished clips from Module 3. The video should be interesting and grab the audience's attention. The Competitor should develop a PowerPoint file（PPT） for the final design proposal and insert the demo video in it. The PPT file should reveal the main ideas, the concept of the project, its originality, and the depth of the work carried out.
The final design proposal should be understandable for the audience without additional information. It should be clear about what project has been developed, for what purpose, and what proposals have been made by the Competitor.
The final design proposal should be a complete conceptual composition with fully developed artistic aspects. At the very least, the followings should be included (the sequence of slides is implemented at the competitor's discretion; the PPT file can contain more information than those listed):

1. Cover page with the name of the project.
2. Design research process demonstration.
3. Sketches demonstration from Module 1 concept exploration and Module 2.

4. Perspective and orthographic renderings.
5. Concept explanations.
6. Color variation renderings.
7. User scenario rendering.
8. General assembly drawing.
9. Exploded drawing.
10. Part drawings.
11. Animation of the camera flying around, design details, object assembly and disassembly, and motion features with background music.
12. End page.

Technical requirements of video development:

1. Synchronicity of the sound track and visuals.
2. Duration of the video: At least 30 seconds.
3. Screen resolution: 1920x1080px.
4. At least two different special effects of Adobe Premiere used in the video.
5. The time for performance of each special effect is not less than 2 seconds.
6. Use of transparency at least once.
7. No "excess" elements inside the frames.
8. Render parameters: mp4 format, resolution-1920x1080px, file named "Video",
9. The size of video file should be no more than 100M.
10. The video working file titled "Project", size of the file should be no more than 100M.

Technical requirements of PPT file development :

1. The ratio of the page is 16:9.
2. Design the layout of the page to make it visually appealing.
3. Insert the demo video into one of the slides and set it to play automatically.
4. Save the PPT file with ".ppsx" extension.

Required deliverable for Module 5:

1. The working file of the video.
2. The final demonstration video.
3. The PPT file of the final design proposal.

NOTE:

1. All the background music files have been put in the "Background Music" folder on your desktop.

2. Create the "M5_Design Proposal" folder in your participant number folder on your desktop, and save all the files of this module to the folder.

Instructions to the Competitor

Each module has specific requirements for the usage of software and devices, and is unable to carry out tasks assigned to other modules or utilize software and devices that do not meet the requirements of that module.

Other

Works will be collected from folder directory on your workstation at each module deadline. Ensure you save your works with the correct filenames.