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1. Introduction

The purpose of this project is to create a 3D model of the Benchy boat using Autodesk Fusion 360. The Benchy boat is a popular 3D printing benchmark model used to test accuracy, overhangs, and surface quality. This project demonstrates fundamental 3D modelling techniques including sketching, extrusion, lofting, filleting, and shell operations.

2. Objectives

- To understand the Fusion 360 interface
- To create 2D sketches for 3D modelling
- To use solid modelling tools such as Extrude, Loft, Sweep, and Fillet
- To apply dimensions and constraints properly
- To generate a complete 3D model of the Benchy boat

3. Software Used

- Autodesk Fusion 360
- Windows 11
- Microsoft Word (for documentation)

4. Modelling Procedure

Step 1: Create a New Project

- Open Fusion 360
- Create a new design
- Save the file as **Benchy_Boat_Model**

Step 2: Create the Base Sketch

1. Select the **XY Plane**
2. Draw the side profile of the boat hull using:
    - Line tool
    - Arc tool
    - Spline tool (if needed)
3. Apply dimensions and constraints
4. Finish sketch

Step 3: Extrude the Hull

- Use the **Extrude** tool
- Select the hull profile
- Set appropriate thickness
- Operation: New Body

Step 4: Shape the Front (Bow)

- Create a new sketch on the side plane
- Draw the front curved profile
- Use **Loft** or **Extrude Cut** to shape the bow

Step 5: Create the Cabin

1. Sketch rectangle on top surface
2. Extrude upward
3. Add front window shape
4. Use Extrude Cut to create windows

Step 6: Add Chimney

- Create circle sketch on cabin roof
- Extrude upward
- Apply fillet to edges

Step 7: Apply Fillets and Details

- Use **Fillet Tool** to smooth edges
- Add small details like:
    - Door outline
    - Window frames
    - Text (optional)

Step 8: Final Touches

- Apply Appearance (colour/material)
- Inspect model
- Save project

5. Tools Used in Fusion 360

Tool	Purpose
Sketch	Create 2D shapes

Tool	Purpose
Extrude	Convert 2D sketch to 3D
Loft	Create smooth transitions
Fillet	Round edges
Shell	Hollow the body
Sweep	Create curved features

6. Result

The 3D Benchy boat model was successfully created using Fusion 360. The final model includes hull curvature, cabin structure, chimney, and smooth edges.

7. Conclusion

This project helped in understanding basic and intermediate 3D modelling techniques in Autodesk Fusion 360. It improved skills in sketching, dimensioning, and applying 3D features effectively.

8. References

- Autodesk Fusion 360 Official Tutorials
- Online CAD learning resource.

PHOTOS OF 3D MODELING


BAMBU LAB
3D PRINTER