

DAY 2

MISSION 1 · DESIGN THE ROBOT

Start with a real job and a real constraint, not a gadget with no purpose.

TODAY'S GOAL Design a robot for one ocean-research job.

EVIDENCE One labeled design brief · 5 points



Autonomous surface vehicle used for lake mapping research.

Photo: Evan Krape, University of Delaware / NOAA Ocean Exploration.

CHOOSE ONE JOB Water Watch · Reef Scout · Trash Tracker · Signal Relay

USER Who needs the information or help?

NEED What must the robot help the user do?

CONSTRAINT What limit makes the design harder?

DESIGN BRIEF Sketch and label the system

DRAW LARGE. LABEL THE SENSOR, INPUT, PROCESS, AND OUTPUT.

MISSION	INPUT	PROCESS	OUTPUT	CONSTRAINT
job + user	what it senses	what it decides	what it does	limit it must handle

DAY 3**MISSION 2 · WRITE, TRACE, REVISE**

An algorithm is useful only when another person can follow it.

TODAY'S GOAL Write a testable algorithm for the robot.**EVIDENCE** Steps + partner trace + revision · 10 points**ALGORITHM Write 6 to 10 ordered steps****WORD BANK** move · scan · sense · record · compare · if · then · repeat · stop

#	ROBOT INSTRUCTION
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

LOGIC CHECK Add one decision and one stop or repeat rule

DECISION IF the robot detects _____, THEN it will _____. _____ _____	STOP / REPEAT The robot will STOP / REPEAT when _____. _____ _____
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TEST Partner trace

PARTNER READS Where did the robot go? _____ _____ _____	PARTNER FLAGS What was unclear or missing? _____ _____ _____	AUTHOR REVISES What exact step did you change? _____ _____ _____
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REVISION STEM I changed step ____ from ____ to ____ because the test showed ____.

DAY 4**MISSION 3 · TRAIN, TEST, IMPROVE**

A model learns patterns from examples. It does not understand the object.

TODAY'S GOAL Train two fair classes and test new examples.

EVIDENCE Evidence table + improvement · 10 points

COLLECT Plan two fair classes

CLASS A NAME _____ TRAINING PLAN Different angles, distances, positions, and people. _____ _____ _____	CLASS B NAME _____ TRAINING PLAN Different angles, distances, positions, and people. _____ _____ _____
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FAIR-TEST RULE Do not use the same example for training and testing.

EVIDENCE Record three tests

TEST EXAMPLE	PREDICTION	CONFIDENCE	CORRECT?	WHAT I NOTICE
New example 1				
New example 2				
New example 3				

REVISE Improve the model using evidence

IMPROVEMENT What will you add, remove, or vary? _____ _____ _____ _____ _____	HUMAN CHECK When should the robot ask a person instead of acting alone? _____ _____ _____ _____ _____
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EVIDENCE STEM The model struggled when _____. We improved it by _____ because the test showed _____.

TODAY'S GOAL Explain one complete smart system.**EVIDENCE** Final trace + peer check + DOL**SYSTEM BRIEF** Build the six-part explanation

PART	YOUR EVIDENCE
1 • USER + NEED	Who needs what help?
2 • ROBOT DESIGN	What physical system will do the job?
3 • INPUT + OUTPUT	What does it sense and do?
4 • ALGORITHM	What ordered rules control it?
5 • MODEL	What pattern does it predict?
6 • HUMAN CHECK	When must a person decide?

GALLERY WALK Trace, check, revise

READ Find the user and need. 	TRACE Follow input → process → output. 	TEST Find one possible failure.
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FEEDBACK STEM Your system is clear when _____. I still wonder what happens if _____.**REVISION** After feedback, I changed _____ because _____.**EXIT** Demonstration of learning

In our system, the robot _____, the algorithm _____, and the model _____. A human should step in when _____.

WEEK EVIDENCE • 25 POINTS | Robot design 5 • Algorithm 10 • Model 10