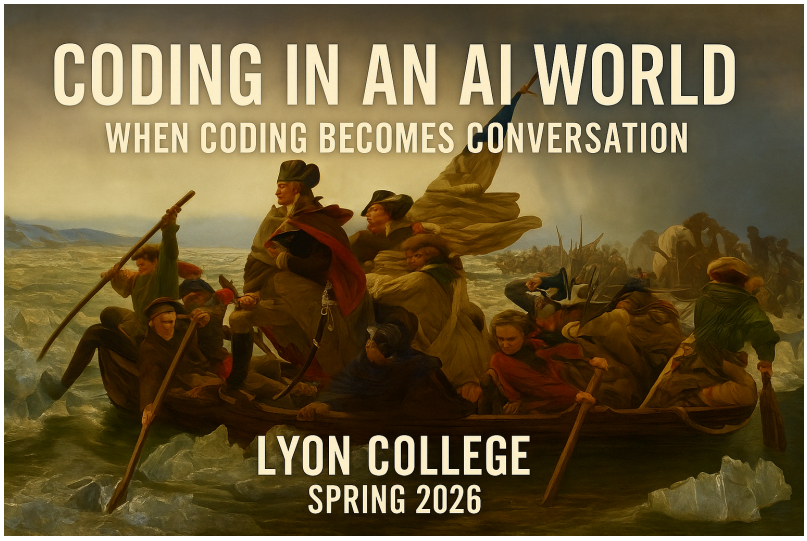
Coding in an AI World - Agenda notebook

DSC 482 - Lyon College - Spring 2026



Week 1 - Overview

- [X] Introduction to the lecturer
- [X] Introduction to the course

Entry Survey Summary — What This Class Looks Like (Week 1)

Background & Experience

- The class has a **very mixed technical background**.
- Several students report **no prior programming experience**.
- Many have **light exposure** (Excel, one CS course, scripting, or tutorials).
- A small number have stronger technical backgrounds, but they are **not the majority**.

Takeaway: This course cannot assume shared technical foundations — and it does not need to.

Prior Use of Generative AI

- Almost everyone has already used **ChatGPT** or a similar tool.
- Typical uses include:
  - Writing assistance
  - Homework support
  - Brainstorming ideas
  - Summarization
- Very few students have used AI for:
  - Automation
  - Multi-step workflows

    - File-based or repeatable tasks

Takeaway: Students are experienced **users** of AI, but not yet **designers** of AI workflows.

Confidence vs. Understanding

- Many students feel AI is **useful**.
- Far fewer feel confident explaining:
    - **How** AI arrives at an answer
    - **Why** it sometimes fails
    - **When** its output should not be trusted

Takeaway: There is a gap between **getting answers** and **understanding processes**.

Motivation for Taking the Course

- Common motivations include:
    - Wanting practical, real-world skills
    - Curiosity about AI beyond hype
    - Improving productivity and efficiency
    - Preparing for future jobs or graduate study
- Very few students cited theory or math as a primary motivation.

Takeaway: This group values **usefulness**, **transferable skills**, and **hands-on work**.

What This Means for the Course

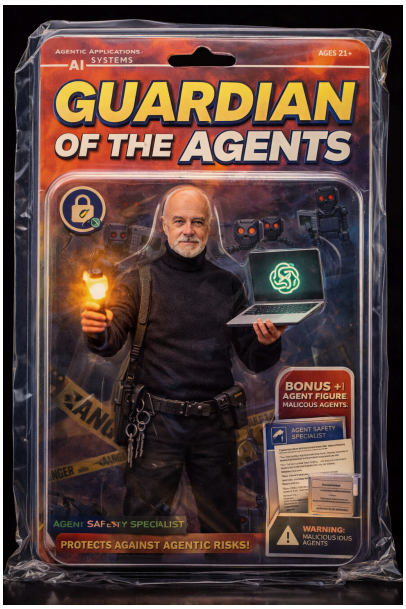
- We will:
    - Start from **conversation and reasoning**, not code
    - Treat AI as a **collaborator**, not an oracle
    - Focus on **workflows**, not one-off prompts
    - Expect everyone to explain what their AI system is doing
- Prior programming experience is **not required** to succeed here.

Bottom line: This course is about learning how to **work with** AI responsibly and deliberately — not just how to get answers from it.

Week 2 - Term project / What is AI

- [X] Tue Review: Course overview (for Quiz 1, due Fri 23-Jan)
- [X] Short warm-up exercise: task analysis (the way of the agent)
- [X] Thu Review: What is AI (for Quiz 2, due Mon 26-Jan)
- [X] Thu Discussion: Do bad data lead to bad AI?
- [X] Practice: Building a simple web app with AI
- [ ] Term project: Instructions, ideas, examples

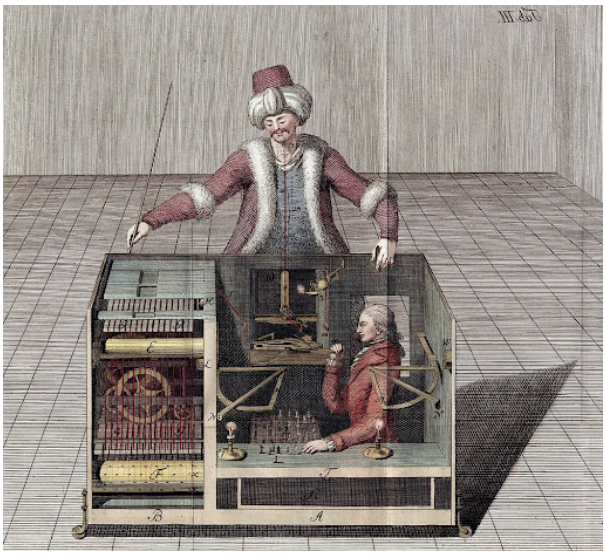
DONE Google Chat review:



What you may have missed:

- Mechanical Turk (Amazon & Chess master)
- AI needs guardrails if the world wants to survive
- Debugging will also be done by machines in the future
- Performance evaluation is already been done by AI
- …as is applications evaluation
- 26 resources to learn AI in 2026
- Summarized the entry survey to justify my approach
- ChapterPal - AI-supported reading [project]
- Prompt engineering is still a thing in 2026
- Hallucinations, fixations, and regression of AI
- Progress in medical imaging (copyright implications)

DONE Review (First session) - Course overview (Tue)



Input: Lecture script, whiteboard screenshots.

ChatGPT prompt:

> "I've attached my first lecture given today. Give me 10 review questions. For the questions don't directly link back to the document. Short questions are better than long ones. Short answers, too. I want to discuss these first thing in the next class. After that I'm going to do the warm-up pair exercise that you suggested. Then give me another 10 based on the attached whiteboard screenshots."

Output:

1. What is the central question of this course?

   Whether using AI means understanding a problem or just delegating it.

2. What is the difference between understanding and delegating?

   Understanding allows explanation and correction; delegating does not.

3. Why is “vibe coding” not enough on its own?

   Because useful output can still be unreliable or poorly understood.

4. What is the main risk of treating AI as a black box?

   You can’t explain, verify, or fix what it produces.

5. What does “conversation before configuration” mean?

   Using dialogue to shape behavior instead of complex setups.

6. Why does the course emphasize workflows instead of tools?

   Tools change; reasoning and structure transfer.

7. What does it mean to say “files are memory”?

    State and progress are stored in inspectable documents.

8. Why are failures and hallucinations treated as learning opportunities?

    They reveal limits and improve verification habits.

9. Why did I describe GenAI “insanely complex”?

    Because it combines many interacting systems beyond the model itself.

10. What skill matters more than prior programming experience in this course?

    Curiosity and willingness to experiment.

11. What is the difference between a **workflow** and a **process**?

    A workflow is a process that can be automated.

12. Why are agents associated with workflows rather than simple scripts?

    Because agents act in and change an environment, not just respond to input.

13. Why will programmers still be needed in an AI-driven world?

    Because someone must design, verify, and maintain reliable workflows.

14. What role does the command line (CLI) play in AI workflows?

    It’s a universal interface for running and chaining actions.

15. Why were shell, terminal, and CLI treated as the same concept?

    Because they all refer to a text-based way of interacting with a system.

16. Why were “Linux / macOS / Windows” crossed out together?

    Because workflows should be independent of the operating system.

17. What does “executable (.exe)” emphasize conceptually?

    That programs ultimately run as machine instructions.

18. Why is Python written alongside AI tools?

    Because it’s a common glue language for workflows.

19. Why mention “Transformer (2017)” on the board?

    To mark the architectural starting point of modern LLMs.

20. What is the core design principle behind this course?

    To make AI behavior understandable rather than magical.

21. What is artificial intelligence trying to achieve?

Performing tasks that normally require human intelligence.

22. What kind of problems does AI handle especially well?

    Finding patterns in large amounts of data.

23. How does modern AI differ from rule-based programs?

    It learns from data instead of following fixed rules.

24. What role does machine learning play in AI?

    It allows systems to improve behavior through data.

25. Why is data central to AI systems?

    Because models are trained and shaped by data.

26. What is a common limitation of AI?

    Its performance depends on data quality and training.

27. Which AI area focuses on interpreting images and visual input?

    Computer vision.

28. What does it mean that AI systems are task-specific? #+begin$_{\text{quotenn}}$ They are built for particular tasks, not general intelligence. #+end$_{\text{quote}}$

29. Why are AI outputs often described as probabilistic?

    They are based on likelihoods rather than fixed outcomes.

30. Why does AI require human oversight?

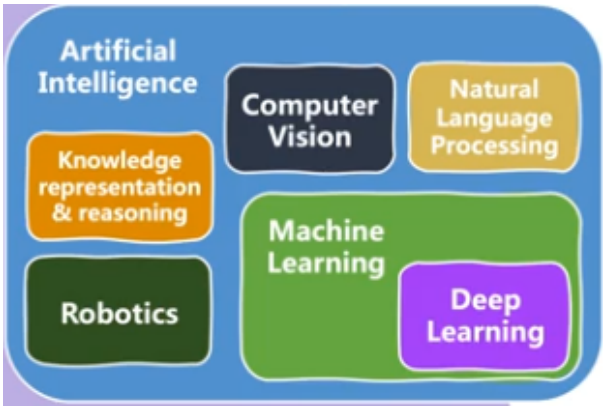
    Because it is powerful but limited and can make mistakes.

The first test "Course Overview", is due on Monday, 26-January (23:59)

DONE Warm-up exercise - "The Way of the Agent" (30 min)

- You already do real workflows every week.
- An agent can **only** automate what you can specify.
- If you cannot **specify** your tasks, you cannot build/use agents.
- A task specification is akin to an **algorithmic** description.
- Find where “human common sense” (**heuristics**) sneaks in, and name it.

DONE Review (DataCamp): What is AI? (Thu)



Auto-generated from the DataCamp video transcripts by ChatGPT 5.2.

1. What foundational question did Alan Turing pose in the 1950s that helped launch AI as a field?

   Whether machines can think.

2. What test did Turing propose as a practical way to evaluate machine intelligence?

Whether a machine can convincingly imitate a human in conversation.

3. In which academic discipline did Artificial Intelligence originally emerge?

   Computer science.

4. How did John McCarthy define Artificial Intelligence in the 1950s?

   As the science and engineering of making intelligent machines.

5. How has the definition of AI expanded beyond early formulations?

   To include learning, reasoning, decision-making, and problem-solving.

6. According to the European Commission, what key capabilities characterize modern AI systems?

   Perception, data interpretation, reasoning, decision-making, and action toward goals.

7. What is Artificial Narrow Intelligence (ANI)?

   AI designed to perform specific tasks well, but not general reasoning.

8. What is Artificial General Intelligence (AGI)?

   Hypothetical AI with human-level intelligence across many tasks.

9. Does true AGI currently exist?

   No.

10. Why are systems like voice assistants and GPT considered “narrow” AI?

    Because they excel at specific tasks but lack general human-like intelligence.

11. What four broad categories of tasks is AI especially good at?

    Prediction, pattern recognition, optimization, and automation.

12. What is Machine Learning’s central capability?

    Learning from data to make decisions without explicit programming.

13. How do predictions differ from inferences in Machine Learning?

    Predictions forecast future events; inferences determine outcomes from existing data.

14. What role does pattern recognition play in AI systems?

    Identifying trends or structures in data to support decisions.

15. How is clustering used in business applications?

    To group customers with similar behaviors.

16. What is anomaly detection commonly used for?

    Identifying unusual or potentially fraudulent activity.

17. What distinguishes Generative AI from other AI approaches?

    It creates new content based on learned patterns.

18. Give one example of an optimization problem AI can solve.

    Finding efficient delivery routes.

19. Why is automation alone not considered AI?

    Because it follows fixed rules without learning or reasoning.

20. Name two key limitations of current AI systems.

    Bias in data and difficulty handling novel situations.

21. What is the main goal of Machine Learning?

    Enabling systems to learn patterns and make predictions from data.

22. How does Deep Learning differ from other Machine Learning methods?

    It uses neural networks with many layers to model complex patterns.

23. What is the purpose of knowledge representation and reasoning in AI?

    To help systems understand information and make logical decisions.

24. How does Computer Vision contribute to AI systems?

    By enabling machines to interpret images and visual data.

25. What does Natural Language Processing (NLP) allow AI systems to do?

    Understand and generate human language.

26. Why do many advanced AI systems combine multiple AI subfields?

    To handle complex, real-world tasks more effectively.

27. What AI areas are combined in a voice assistant?

    NLP (Natural Language Processing) and Deep Learning (Neural Networks).

28. How are AI and Data Science related?

    Both extract value from data using mathematical and statistical methods.

29. Name two non-technical disciplines that influence AI development.

    Ethics and law.

30. Why is understanding AI's related disciplines important?

    Because AI development and use affect society beyond technology alone.

DONE Discussion (Thu)

The DataCamp video ("What can AI do?") from chapter 1 states:

> »AI is only as good as the data it learns from.«

In IT, this is also called "Garbage in, garbage out." (GIGO)

Discuss:

1. Do you think this is true?

   > Yes, but it's incomplete: Bad data sets the limits of what an AI can reliably learn; good data does not guarantee good behavior.

2. Can you find an example for 'bad data' leading to 'bad AI'?

   - Facial recognition systems respond directly to training data based on skin color - e.g. cannot see X-skinned people.
   - Medical AI trained on data from one population failing on another. Skin cancer recognition depending on skin color.
   - Hiring systems encode discrimination when based on certain data.

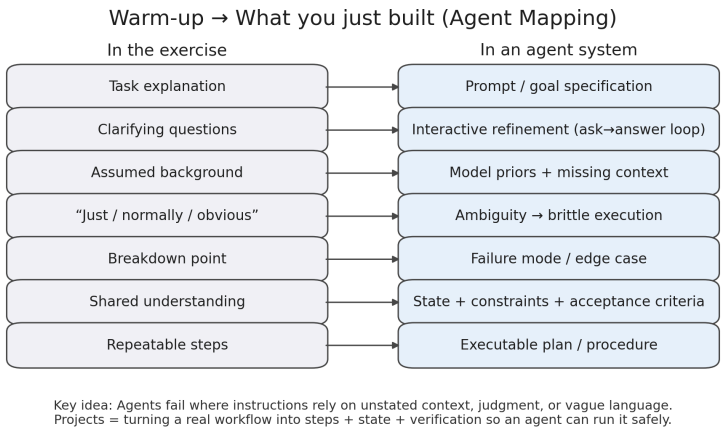
3. Is this true for humans?

   > Yes, and no. Humans also learn from examples, experiences, feedback. "Bad data" correspond to: lack of information, biased feedback. But humans can reflect on their data and question it. They can also use bad data to develop resilience to it (e.g. click bait, email scams, fake news).

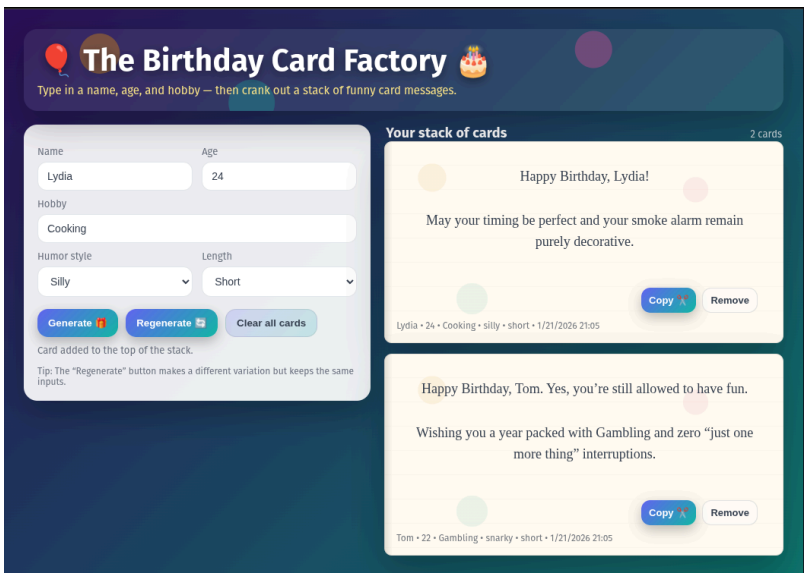
4. Can you find a counterexample ('bad data' leading to 'good AI')?
5. Can you find a counterexample for human decisions?

- 'Bad' data are: noisy, missing, or incorrect.
- 'Good AI' is AI that makes predictions with high accuracy.
- Example for 4): AI "toxicity training" (Li et al, 2025)
- Examples for 5): Scientific serendipity (failed experiments leading to good scientific results): Discovery of penicillin by accident through Fleming in 1928; Vicarious learning or "crash test" effect: humans can learn from other people's bad data without experiencing it themselves.

DONE Review: The Way of the Agent



DONE Building a simple web app in 5 minutes



- I'm going to demonstrate the process for you.
- You're going to get a prompting template.
- Then you have to apply the template yourself.
- This is still a cognitive, not a true agent.
- Next, we're going to build a simple game.

Week 3 - Tasks AI can solve

- [ ] REVIEW: Which tasks can AI solve (Quiz 3, due 30-Jan)?
- [ ] DISCUSSION: Term project: Instructions, ideas, examples
- [ ] PRACTICE: ChatGPT Personalization

[The Thinking Machine (1961)]

Term project: Instructions, ideas, examples

- Two options: Build your own single **agent**, or research an AI **topic**.
- Purpose is **not** to deliver a complete product but to **learn** as you go.
- Sprint 1 (Feb 9): Develop a structured project proposal.
- TODO:
    1. Look at the shared documents in my GDrive folder: tinyurl.com/agent-project - instruction, example, ideas
    2. Enter your name and project title in `Canvas > Pages > Projects` table.
    3. Begin working on your proposal and share your prototype(s) freely with me.
    4. It's good to try out several proposals before settling on one.
- Must understand the difference between **cognitive** and **true** agents.

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