

Lecture 1: Intro to Ethical Software Systems

CS 181E

Fall 2026

<https://cs.pomona.edu/classes/cs181e>



What is this class?

The (planned) approach

- technical tools and techniques that advance (or impede) ethical best practices
 - includes things like privacy, fairness, anti-bias/disparate impact, environment impact, societal impact
- there will be a lot of programming (including ML)
- there will be some math (including proofs)
- Preqs: CS 54 + CS 62

The (planned) approach

Week	Day	Date	Topic	Reading	Homework
Introduction					
1	Mon	Aug 31	Intro to Ethics		
	Wed	Sept 2	Intro to Privacy		A1
Software Systems					
2	Mon	Sept 7	Labor Day		
	Wed	Sept 9	Anonymity		A2
3	Mon	Sept 14	Differential Privacy		
	Wed	Sept 16	Differential Privacy		A3
4	Mon	Sept 21	Online Tracking		
	Wed	Sept 23	Private Advertising		A4
5	Mon	Sept 28	No class		
	Wed	Sept 30	No class		
6	Mon	Oct 5	Privacy Rights		
	Wed	Oct 7	Manipulative design		A5
7	Mon	Oct 12	Recommendation Systems		
	Wed	Oct 14	Heterogenous Data		
Machine Learning Systems					
8	Mon	Oct 19	Fall Break		
	Wed	Oct 21	Intro to ML		A6
9	Mon	Oct 26	Unfairness and Bias		
	Wed	Oct 28	Explainable AI		A7
10	Mon	Nov 2	Privacy Attacks		
	Wed	Nov 4	Private ML		A8
11	Mon	Nov 9	Local ML		
	Wed	Nov 11	Federated ML		M1 - Project Proposals
12	Mon	Nov 16	LLMs and Energy		
	Wed	Nov 18	LLMs and Copyright		
13	Mon	Nov 20	Problematic Uses		

Ethics

ethic **noun**

eth·ic ('e-thik ▶▶)

[Synonyms of *ethic* >](#)

1 a : a set of moral principles : a theory or system of moral values

| the present-day materialistic *ethic*

| an old-fashioned work *ethic*

→ often used in plural but singular or plural in construction

| an elaborate *ethics*

| Christian *ethics*

b ethics ('e-thiks ▶▶) **plural in form but singular or plural in construction** : the principles of conduct governing an individual or a group

| professional *ethics*

c : a consciousness of moral importance

| forge a conservation *ethic*

d : a guiding philosophy

2 ethics plural : a set of moral issues or aspects (such as rightness)

| debated the *ethics* of human cloning

Example 1

Meta agrees to major changes to Facebook and Instagram as it settles US trial over teen addiction for up to \$18bn

US tech giant agrees to establish further protections for teens such as daily usage limits and blocks on night-time use

Blake Montgomery and Dara Kerr

Wed 26 Aug 2026 16.30 EDT

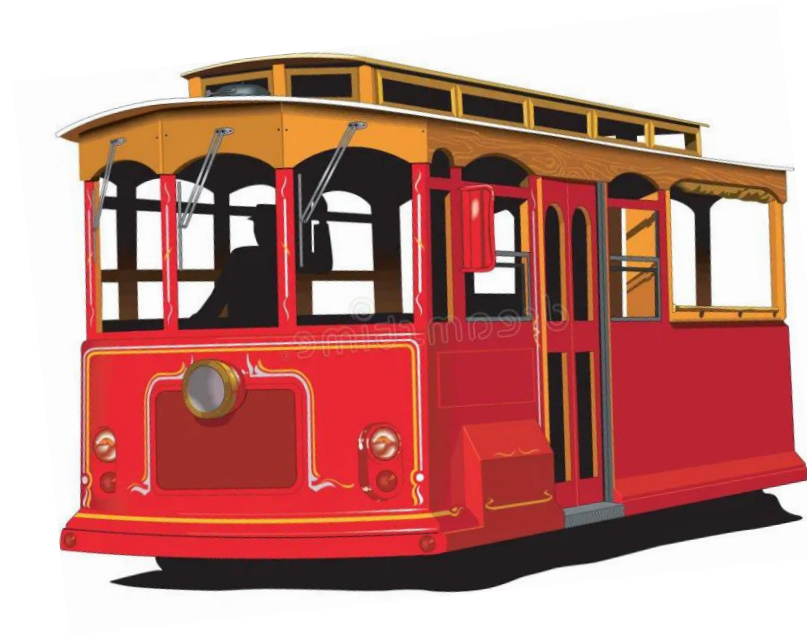
Consequentialist Ethics

- **General Idea:** what matters is the impact
- **Approach:** assess benefits/harms each possible choice
- **Ethical choice:** maximize net benefit

Example: Applying Consequentialism

Scenario: A runaway trolley with no brakes. Five people are tied to the current track. One person is tied to the other track.

1. *Do Nothing*
2. *Switch Tracks*



Exercise: Applying Consequentialism

Scenario: Company A is designing a new social networking app and needs to decide which posts to display to users. They can either display recent posts from accounts the user follows or they can use information they know about the person to recommend content they think they'd like. Preliminary user testing shows that most users prefer the recommended content and spend more time on the app that way.

1. *Display recent content from friends*
2. *Display recommended content*



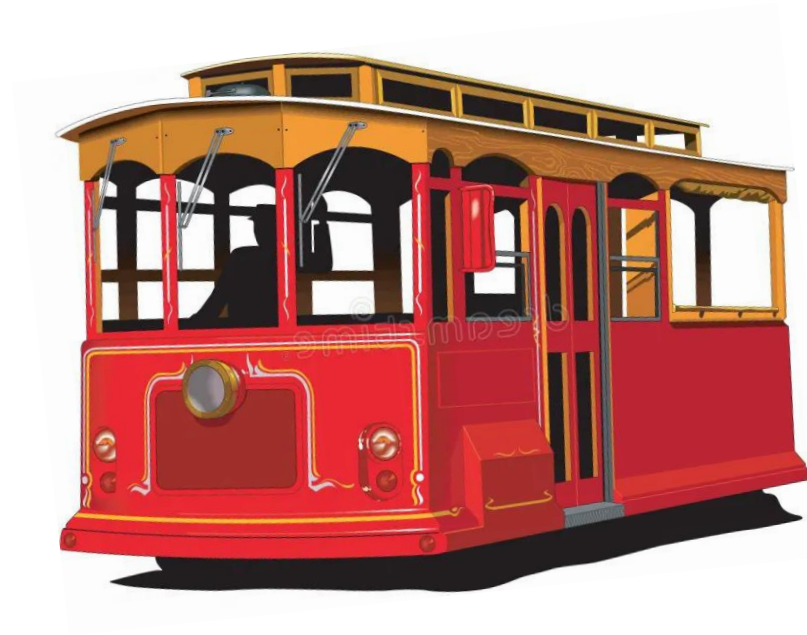
Deontological Ethics

- **General idea:** what matters is process
- **Approach:** consider what rights/values various stakeholders have
- **Ethical choice:** respect rights/values
 - “What sort of world do I want to live in?”

Example: Applying deontology

Scenario: A runaway trolley with no brakes. Five people are tied to the current track. One person is tied to the other track.

1. *Do Nothing*
2. *Switch Tracks*



Exercise: Applying deontology

Scenario: Company A is designing a new social networking app and needs to decide which posts to display to users. They can either display recent posts from accounts the user follows or they can use information they know about the person to recommend content they think they'd like. Preliminary user testing shows that most users prefer the recommended content and spend more time on the app that way.

1. *Display recent content from friends*
2. *Display recommended content*



Exercise: Combining Ethical Frameworks

Scenario: Company A discovers a new machine learning model that can predict hiring decisions with 90% accuracy. This software will streamline the hiring application and interview process.

1. *Using the ML model to make hiring decisions*
2. *Using the ML model to do initial screening and then interview recommended candidates*
3. *Use a fully-human hiring process*

- What would be the most ethical decision according to consequentialist ethics?
- What would be the most ethical decision according to deontological ethics?
- What do you personally think is the most ethical decision?

Exercise: Applying Ethical Theory

- Under what circumstances is it ethical to use LLMs generally?
- Under what circumstances is it ethical to use LLMs in this course?
- To what extent do consequentialist ethics, deontological ethics, and your personal instincts give different answers?

LOGISTICS

Course Logistics



Prof. Eleanor Birrell

Research in usable security and privacy
OH: MW 3-5pm

- **Class Meetings:**

- Monday and Wednesday, 1:15-2:30pm in Edmunds 101

Course Work

- Homework (45%)
 - Approximately 8 weekly homeworks
 - Goal: reinforce and engage more deeply with material covered in class
 - All assignments will be due Wednesdays at 11:59pm PT
- Final course project (35%)
 - Do something cool and individual relating to the course material
 - Done in groups of 2-4
 - Proposals due Nov 18
 - Presentations in class Dec 7-9
 - Final project due Dec 9
- Participation (10%)
 - Show up! Participate! Have fun!

Course website

<https://cs.pomona.edu/classes/cs181e>

- All information is on the course website

