STEVENS
INSTITUTE of TECHNOLOGY
Schaefer School of Engineering & Science

CS 485:
Societal Impacts of Information Technology

Fall 2020

Prof. Eric Koskinen

Groups

- **Group 1**. Topic? Article?
- **Group 2**. Topic? Article?
- **Group 3**. Topic ideas? Reservations accepted!
- **Group** assignments.

Code of Ethics

Why do we have/need ethics?

Code of Ethics

Why do we have/need ethics?

- Same goals as laws.
- Know where the boundaries are.
- Every profession’s guiding principles. e.g. Hippocratic Oath in Medicine.
- Otherwise could take advantage.
- Software is everywhere now, so software engineering ethics matter.

MIT Technology Review

A View from **Vivek Wadhwa**

Laws and Ethics Can't Keep Pace with Technology

Employers can get into legal trouble if they ask interviewees about their religion, sexual preference, or political affiliation. Yet they can use social media to filter out job applicants based on their beliefs, looks, and habits. Laws forbid lenders from discriminating on the basis of race, gender, and sexuality. Yet they can refuse to give a loan to people whose Facebook friends have bad payment histories, if their work histories on LinkedIn don't match their bios on Facebook, or if a computer algorithm judges them to be socially undesirable.

These regulatory gaps exist because **laws have not kept up with advances in technology**. The gaps are getting wider as technology advances ever more rapidly. And it's not just in employment and lending—the same is happening in every domain that technology touches.

Association for Computing Machinery

Code of Ethics and Professional Conduct

Computing professionals' actions **change the world**. To act responsibly, they should reflect upon the **wider impacts of their work**, consistently supporting the public good. The ACM Code of Ethics and Professional Conduct ("the Code") expresses the conscience of the profession.

The Code is designed to inspire and guide the ethical conduct of all computing professionals, including current and aspiring practitioners, instructors, students, influencers, and anyone who uses computing technology in an impactful way. Additionally, the Code serves as a basis for remediation when violations occur. The Code includes principles formulated as statements of responsibility, based on the understanding that the **public good is always the primary consideration**. Each principle is supplemented by guidelines, which provide explanations to assist computing professionals in understanding and applying the principle.

The Code as a whole is concerned with **how fundamental ethical principles apply to a computing professional's conduct**. The Code is not an algorithm for solving ethical problems; rather it serves as a **basis for ethical decision-making** ... The entire computing profession benefits when the ethical decision-making process is accountable to and transparent to all stakeholders. Open discussions about ethical issues promote this accountability and transparency.

https://www.acm.org/code-of-ethics

Association for Computing Machinery

Code of Ethics and Professional Conduct

1.1 Contribute to society and to human well-being, acknowledging that all people are stakeholders in computing.

1.2 Avoid harm.

1.3 Be honest and trustworthy.

1.4 Be fair and take action not to discriminate.

1.5 Respect the work required to produce new ideas, inventions, creative works, and computing artifacts.

1.6 Respect privacy.

1.7 Honor confidentiality.

https://www.acm.org/code-of-ethics

Association for Computing Machinery

Code of Ethics and Professional Conduct

2. PROFESSIONAL RESPONSIBILITIES.

2.1 Strive to achieve high quality in both the processes and products of professional work.

2.2 Maintain high standards of professional competence, conduct, and ethical practice.

2.3 Know and respect existing rules pertaining to professional work.

2.4 Accept and provide appropriate professional review.

2.5 Give comprehensive and thorough evaluations of computer systems and their impacts, including analysis of possible risks.

2.6 Perform work only in areas of competence.

2.7 Foster public awareness and understanding of computing, related technologies, and their consequences.

2.8 Access computing and communication resources only when authorized or when compelled by the public good.

2.9 Design and implement systems that are robustly and usably secure.0

https://www.acm.org/code-of-ethics

Association for Computing Machinery

Code of Ethics and Professional Conduct

3. PROFESSIONAL LEADERSHIP PRINCIPLES.

3.1 Ensure that the public good is the central concern during all professional computing work.

3.2 Articulate, encourage acceptance of, and evaluate fulfillment of social responsibilities by members of the organization or group.

3.3 Manage personnel and resources to enhance the quality of working life.

3.4 Articulate, apply, and support policies and processes that reflect the principles of the Code.

3.5 Create opportunities for members of the organization or group to grow as professionals.

3.6 Use care when modifying or retiring systems.

3.7 Recognize and take special care of systems that become integrated into the infrastructure of society.

https://www.acm.org/code-of-ethics

Presentations

Sample Topics

- Biometric readers
- The sharing economy
- When is it OK to take people's pictures?
- Unexpected effects of social media
- Unexpected effects from the ease with which information can spread
- Mission and activities of the Electronic Frontier
- Self driving cars/planes
- Retail electronic payment systems
- Electronic currencies
- Economic models for information and information-based services
- Online anonymity
- Should Internet access be a fundamental human right?

Sample Topics

- Software patents
- Software licensing
- Internet governance
- Internet culture clash
- Privacy implications of mining big data
- Net neutrality
- Tor
- High frequency trading
- Video game streaming
- Telemedicine
- GPS spoofing
- The Turing test
- Internet shaming
- Uber surge pricing
- The right to be forgotten.

Articles

- Choose a few articles on your topic.
- Typically these will be newspaper articles.
    - e.g. NY Times Science /Business section,
- Could also be magazine articles.
    - e.g. Nature, Wired
- Journal Articles
    - CACM
- At least one should be a longer exposition.

Presentation Content

Based on the Learning Objectives of the course.

1. Identify which individuals, groups, and societies are affected by a given information technology
2. Identify and analyze the advantages and disadvantages of a given information technology for those affected by it
3. Recall standard professional codes of ethics and explain how the codes bear on the everyday activities of an IT professional
4. State how the job activities of a typical IT professional might be connected to major technology-related ethical issues of the day

Presentation Content

Summarize Topic/Article. 5 W's.	
Identify **Technology Involved**	What is the technology? How does it work? Dig deeper: product web page?
Identify **Stakeholders.**	May not be mentioned in the article. Think about who they might be? Individuals? Groups? Society? Justify.
Identify **Major Impacts** and **advantages/disadvantages.**	For each stakeholder. Justify each.
Other **issues/challenges.**	
Identify **Ethical Concerns**.	e.g. Impact X may violate human right Y of stakeholder Z.
Identify **Code of Ethics** standards.	Do any apply? If so, how?
Relate to my job as an IT professional?	How might this issue affect you or your colleagues?
Discuss possible **solutions**/alternatives.	Why should we be restricted to this situation?

Presentation Content

Let's do an example.

Here was an article that interested me.

Presentation Content

BBC | Sign in | News | Sport | Weather | Shop | Earth | Travel | M

NEWS

Home | Video | World | US & Canada | UK | Business | Tech | Science | Magazine | Ent

Business | Market Data | Markets | Global Trade | Companies | Entrepreneurship | Techn

August 2017

A former Volkswagen engineer who helped develop a device that enabled cars to evade US pollution rules has been sentenced to more than three years in prison and ordered to pay $200,000.

James Liang, 63, was the first person prosecuted in the emissions scandal.

The US investigation has led to charges against seven others in the US and sparked probes in other countries.

Volkswagen has admitted guilt, agreeing to spend as much as $25bn to address US claims.

Liang co-operated with prosecutors, who argued that his help with the investigation warranted a reduction in the possible punishment to three years in prison and a $20,000 fine.

But US District Court Judge Sean Cox opted for a harsher penalty of 40 months and a $200,000 penalty, saying he wanted to send a message to others in the car industry.

Presentation Content

That article lead me to more questions,
so I went back to also read:
an earlier October 2016 NPR article,
and a Dec 2015 BBC article

Presentation Content

Summarize Topic/Article. 5 W's.	Settlement. Software installed that cheated emissions tests.
Identify **Technology Involved**	Reduce emissions. Cars increasingly self-driving. Software matters. Emissions cheating: better in test conditions.
Identify **Stakeholders.**	Federal judge, VW, US Govt', EPA, Consumers. High-level VW management, low-level VW employees, SWE James Liang
Identify **Major Impacts** and **advantages/disadvantages.**	Gov't is forcing manufacturers to reduce emissions. VW stock went down. Settled quickly to move forward.
Other **issues/challenges.**	
Identify **Ethical Concerns**.	Cheating. Pollution leads to health problems. Self-driving cars: life and death.
Identify **Code of Ethics** standards.	Public health
Relate to my job as an IT professional?	
Discuss possible **solutions**/alternatives.	

Example

Summary

Summary

- Volkswagen wanted to capture US market with low diesel emissions
- Built software that would detect when a test was happening and cheat.
- Scientists (West Virginia Univ.) caught VW cheating and court case was brought by the government/consumers/EPA.
- Volkswagen punished with $25bn, Software Engineer 40mo prison.

Example

Summary

Technology Involved

- Turbocharged direct injection (TDI) engine software
- Portable Emissions Measurement System (PEMS)
- Emissions controls were programmed to activate only during lab tests

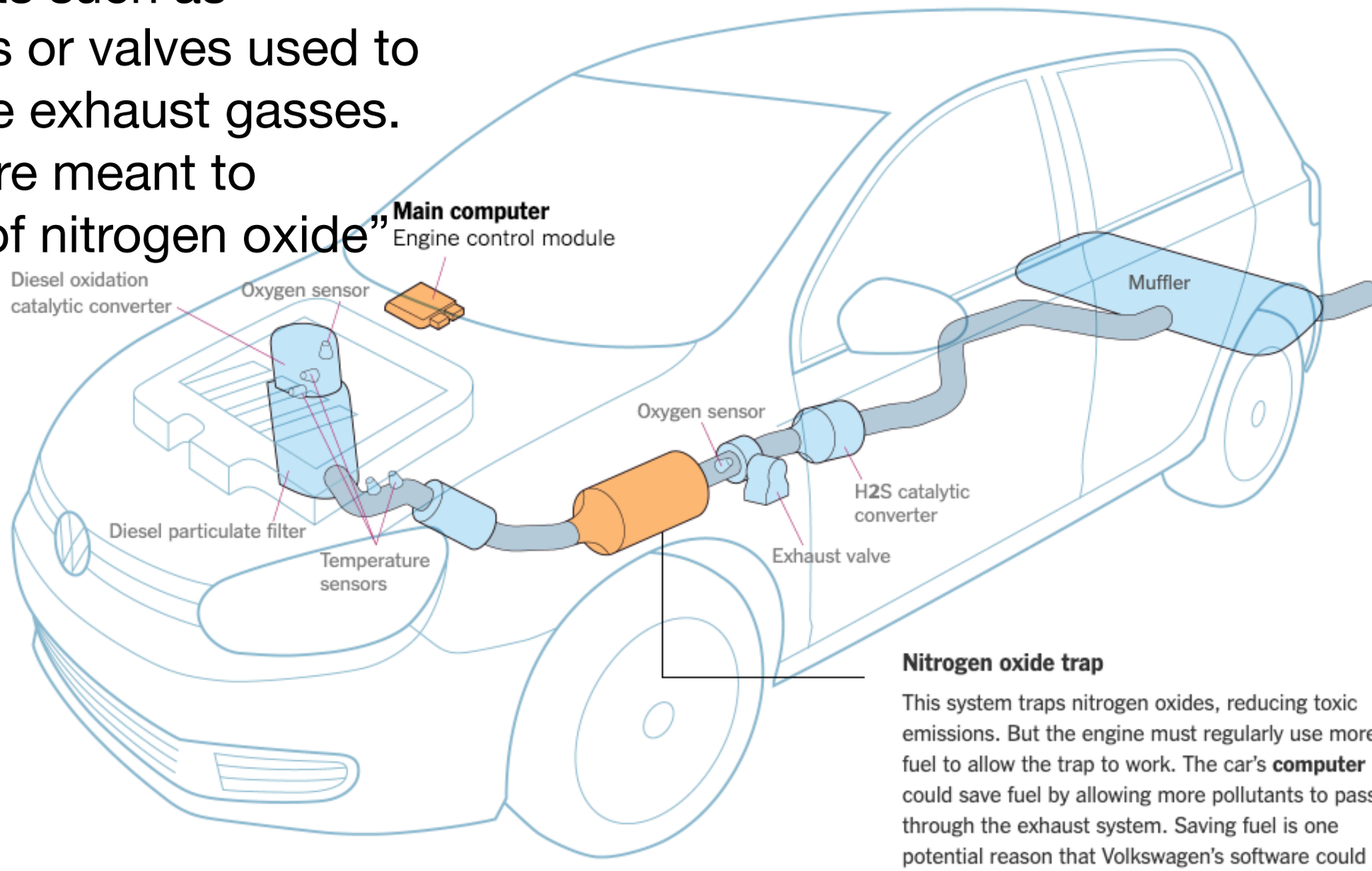
https://www.bbc.com/news/business-34324772

Example

Summary

Technology Involved

"Adjust components such as catalytic converters or valves used to recycle some of the exhaust gasses. The components are meant to reduce emissions of nitrogen oxide"



Nitrogen oxide trap

This system traps nitrogen oxides, reducing toxic emissions. But the engine must regularly use more fuel to allow the trap to work. The car's **computer** could save fuel by allowing more pollutants to pass through the exhaust system. Saving fuel is one potential reason that Volkswagen's software could have been altered to make cars pollute more,

https://www.nytimes.com/interactive/2015/business/international/vw-diesel-emissions-scandal-explained.html

Example

Summary

Technology Involved

- Cars run on rollers during test
- Urban Dynamometer Driving Schedule (UDDS) - 7.5 miles of urban driving.

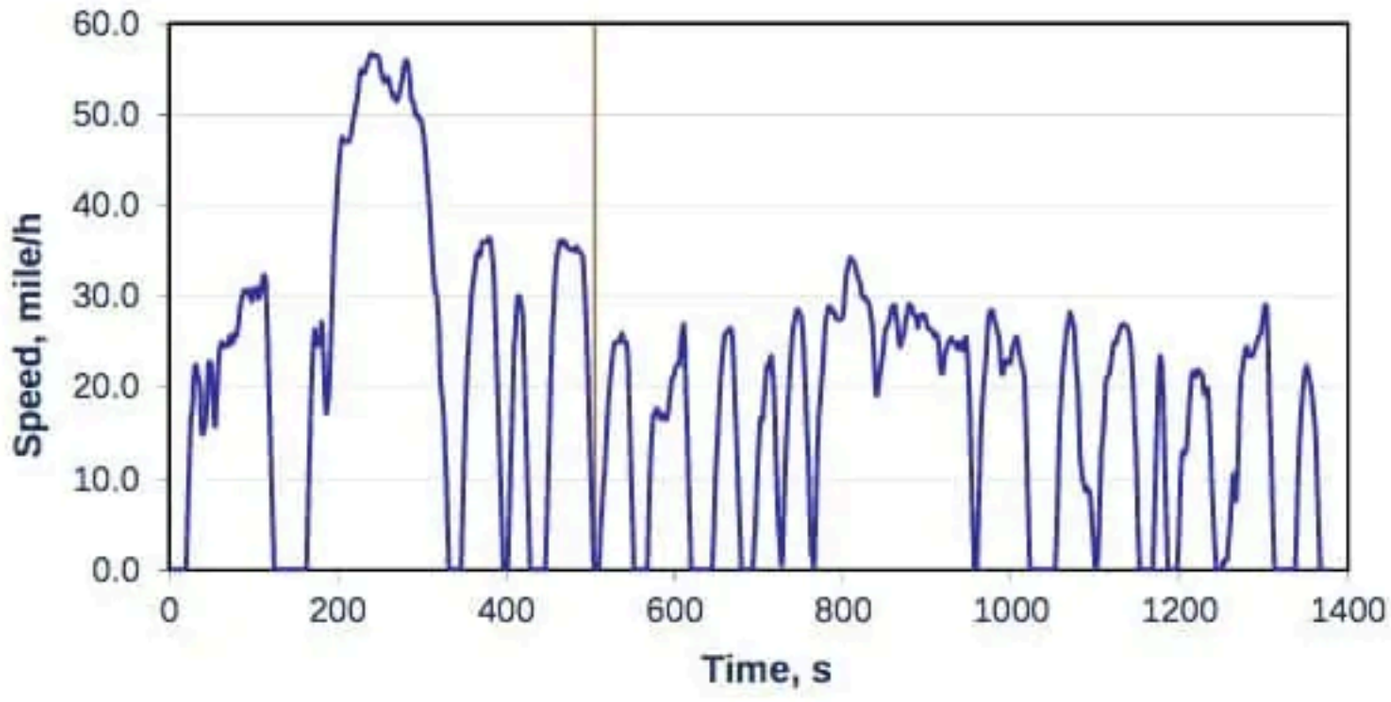


Figure 1. US EPA Urban Dynamometer Driving Schedule (FTP-72)

- Eg first 505 seconds : up to highway speeds. Then stop-and-go.

https://www.washingtonpost.com/news/the-switch/wp/2015/09/22/the-tech-behind-how-volkswagen-tricked-emissions-tests/

Example

Summary

Technology Involved

- Sense test scenarios
- Various parameters:
    - speed
    - engine operation
    - air pressure
    - position of the steering wheel
    - Barometric pressure
- “Adjust components such as catalytic converters or valves used to recycle some of the exhaust gasses. The components are meant to reduce emissions of nitrogen oxide”

https://www.bbc.com/news/business-34324772

Example

Summary

Emissions Tests

- West Virginia University
- Portable Emissions Measurement System (PEMS)

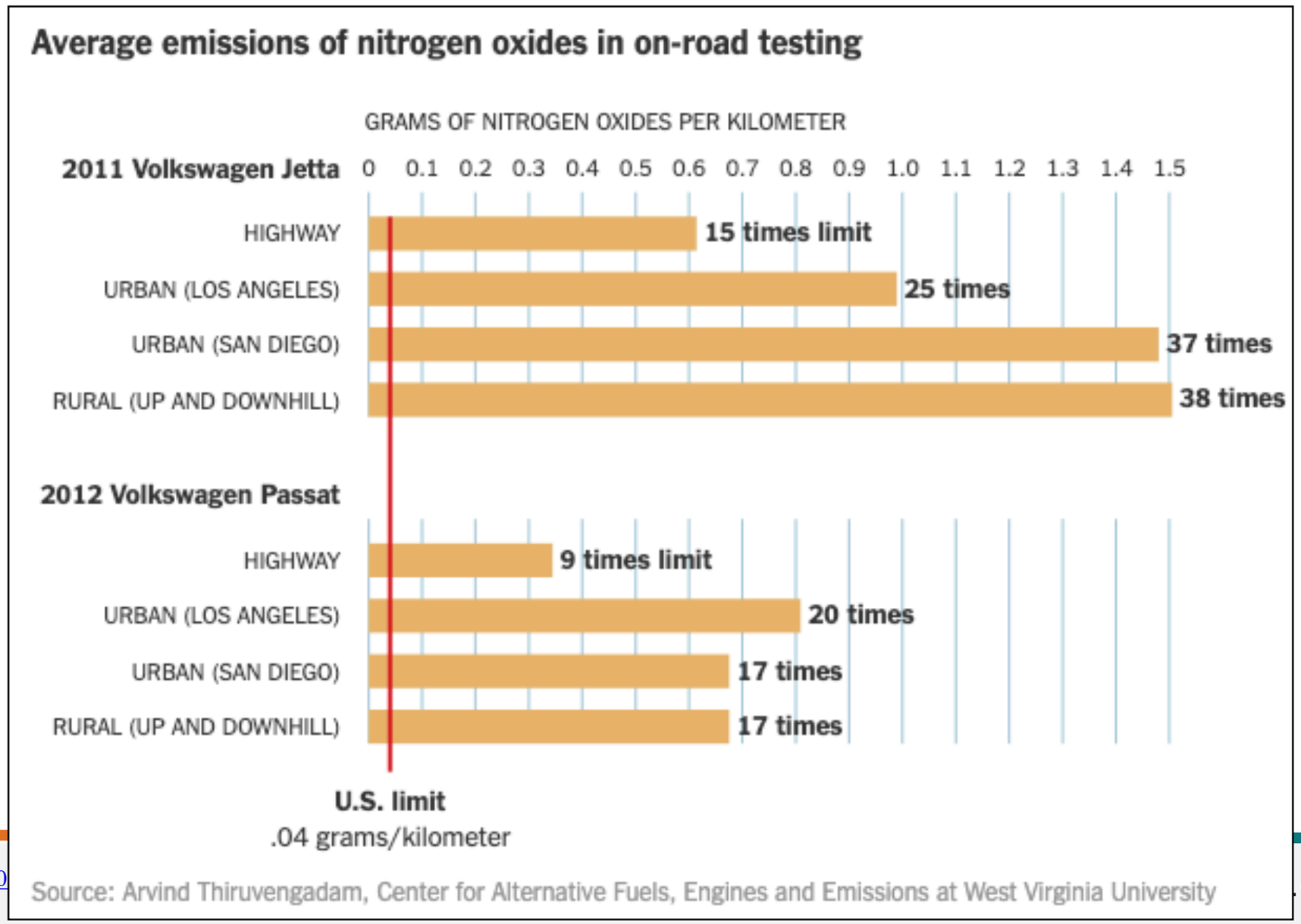
https://www.nytimes.com/interactive/2015/business/international/vw-diesel-emissions-scandal-explained.html

Example

Summary

Emissions Tests

- Two VW models with 2L turbocharged 4-cylinder diesel engine.
- On the road, emitted almost 40 times permitted levels of nitrogen oxides.



https://www.nytimes.com/interactive/20

Example

Summary

VOLKSWAGEN
Jetta
2009 to 2015

VOLKSWAGEN
Beetle and Beetle Convertible
2012 to 2015

VOLKSWAGEN
Passat
2012 to 2015

AUDI
A3
2010 to 2015

VOLKSWAGEN
Jetta SportWagen
2009 to 2014

VOLKSWAGEN
Golf
2010 to 2015

VOLKSWAGEN
Golf SportWagen
2015

600,000 vehicles in US
Plus 8.5M world-wide

Example

Summary

VOLKSWAGEN
Touareg
2009 to 2016

AUDI
A6 Quattro
2014 to 2016

AUDI
A7 Quattro
2014 to 2016

AUDI
A8 and A8L
2014 to 2016

AUDI
Q5
2014 to 2016

AUDI
Q7
2009 to 2016

PORSCHE
Cayenne
2013 to 2016

Stakeholders & Impacts

Example

- **Volkswagen Upper Management**
    - Lost $25bn to resolve the issue.
    - Tarnish reputation and, thus, brand.
    - Wanted to lead in the US, now set back.
- **James Liang and other VW employees**
    - Prison, Fine, Reputation
- **Government/EPA**
    - The fine demonstrated that EPA takes it seriously.
    - Testing mechanism not rigorous enough. Invest more in testing.
- **American People, World**
    - Environmental damage

Example

Advantages & Disadvantages

- **Further discussions . . .**

(Omitted here for lack of time.)

Example

Code of Ethics

- **James Liang and other VW employees**
  - Not “mastermind”
  - But “abdicated his responsibility to speak out”
  - “Unless individual actors are also punished, future corporate employees and contractors may be tempted to justify their criminal behavior as just ‘doing their jobs’ or ‘following orders’.” (Said the prosecutors)
- **Code of Ethics** that apply
  - ACM. 1.1 “minimize negative consequences of computing, including threats to **health**, safety, personal security, and privacy”

Example

Code of Ethics

- 1.3 Be honest and trustworthy.
- 2.2 Maintain high standards of professional competence, conduct, and ethical practice.
    - “awareness of the social context in which their work may be deployed”
- 3.1 Ensure that the public good is the central concern during all professional computing work.
- **Leadership**
    - 3.4 “Leaders should pursue clearly defined organizational policies that are consistent with the Code and effectively communicate them to relevant stakeholders. In addition, leaders should encourage and reward compliance with those policies,”

Example

Better Solutions

- Better testing by the EPA
- Outlet/recourse for Software Engineers under duress
- Require this kind of software/technology to be published. Use of open source software?
- Find the “mastermind” rather than the fall guy

Stances

1. **Software engineer should not be jailed**. He was a fall man. They should have found the “mastermind.”
2. **Software engineer should be jailed**. Fair punishment for violating the Code of Ethics. With even more jail time, every software engineer would know about it and take caution.
3. **EPA should not receive the fine**. Testing was insufficient. Money should go to the public, climate change organization, etc. Fund the scientists who discovered the cheating.
4. **Case is blown out of proportion**. No one died. Diesel emissions is small compared to unleaded emissions, especially in developing nations. Wasting time on small issues rather than investing the time/money in major changes.

Presentations

1. Pick a topic.
2. Pick some articles.
3. Read the articles. Dig deeper. Organizations' web pages.
4. Discuss as a group.
5. Prepare slides.
6. Do practice talks. Refine slides. Figure out gaps.
7. Prepare to defend stances.

Professional Presentations

Part 1: Creating Professional Presentations

Part 2: Delivering Presentations

Part 1:
Creating Professional Presentations

Best Advice

Best Advice

KEEP. IT. SIMPLE.

Best Advice Cont.

- Have an obvious beginning, middle, and end.
- Keep it relevant.
- Keep it short.
- Keep your audience in mind.

Outline

- Make your first or second slide an outline of your presentation.

- Follow the order of your outline for the rest of the presentation.

Common Mistakes on Slides

- Cluttered text, too much information
- Boring visuals, meaningless graphics
- Harsh or “cute” colors/fonts
- Too much animation
- Grammatical errors, typos

Effective Slide Structure

- Use 1-2 slides per minute.
  - Be sure to stay within your time limit.
- Include five or fewer points per slide.
- Title each slide appropriately.
- Write in short phrases.
- Use left-justified text in most cases.

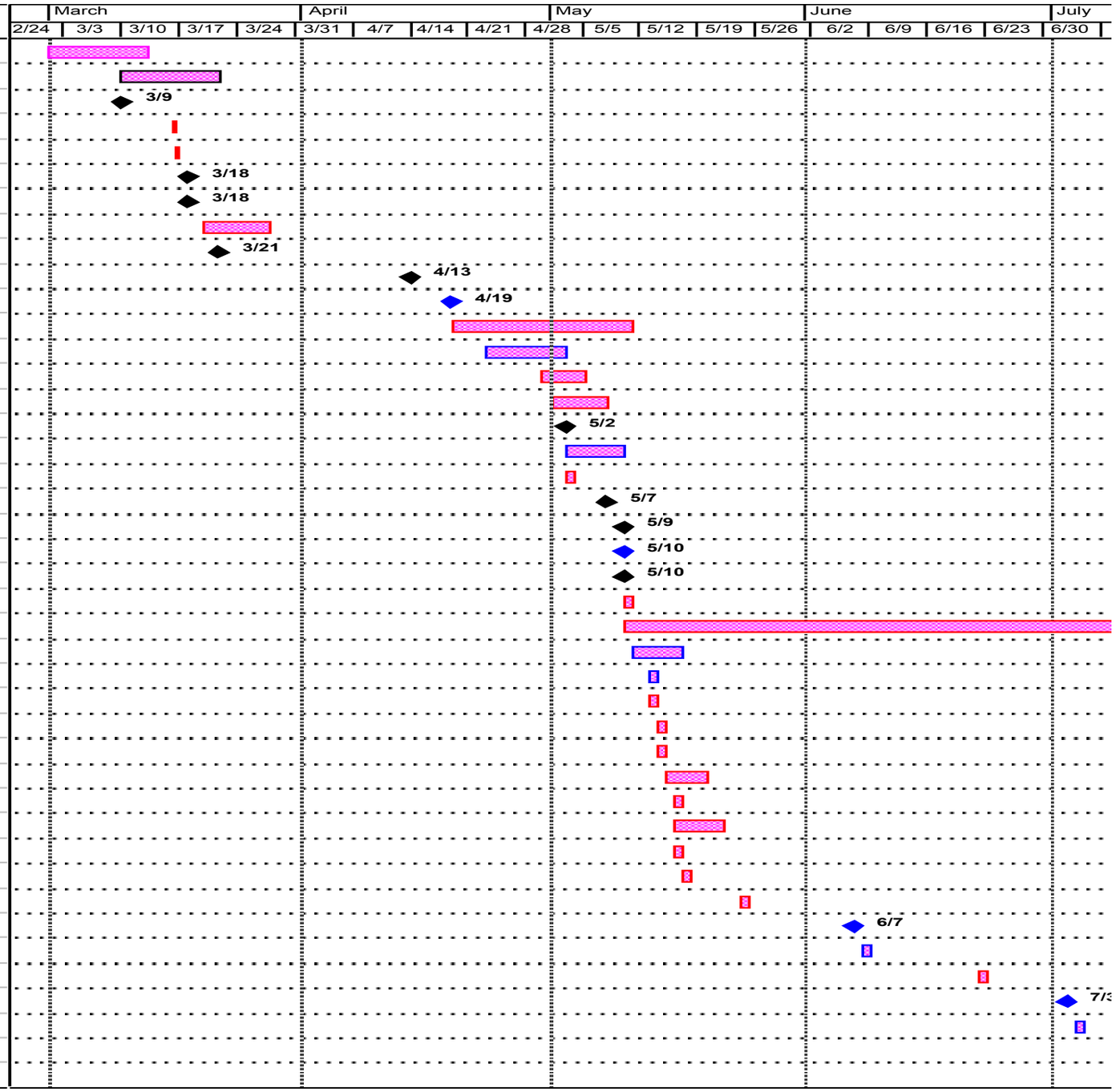
Visuals

Use simple tables, graphs, charts, and other visuals to tell the story and highlight data points.

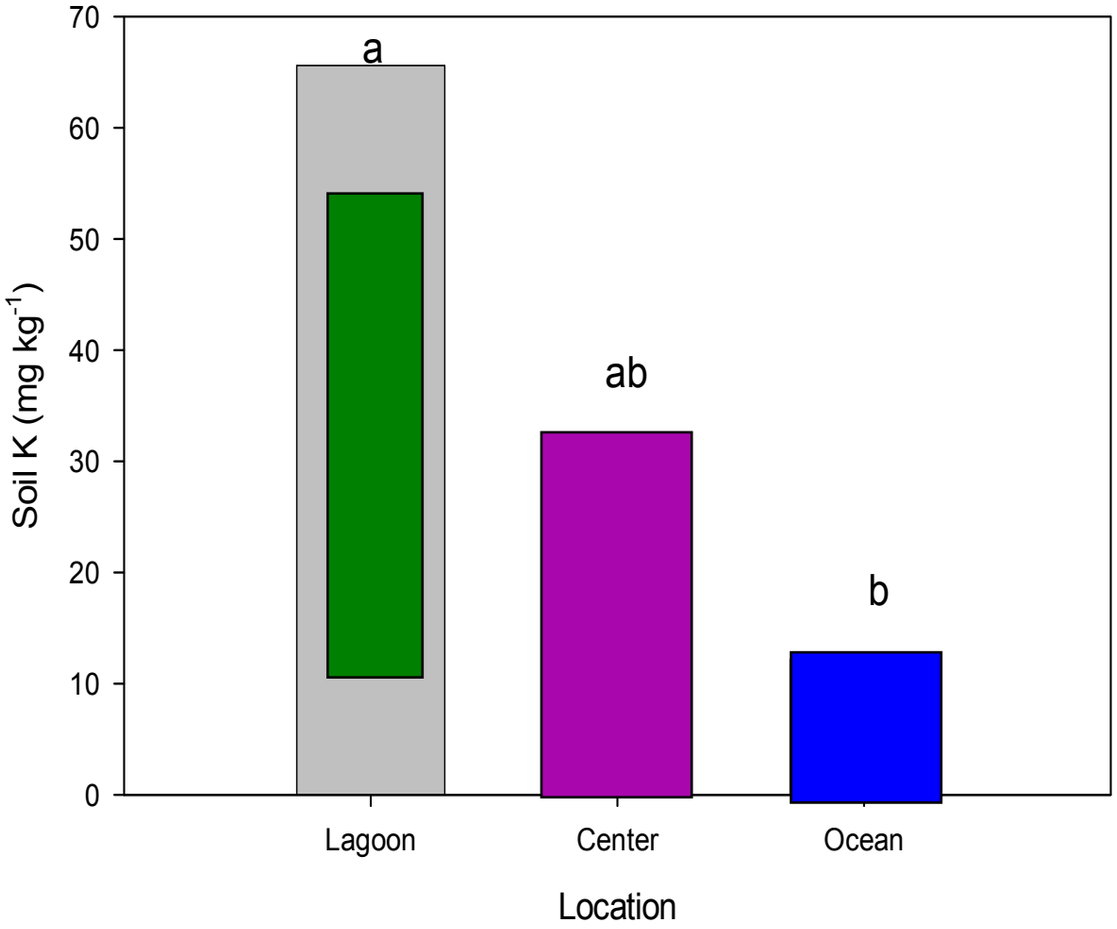
- Graphics are easier to comprehend.
- Trends are easier to visualize.
- Always title graphs, charts, and tables.

Visuals Cont.

ID	Task Name	Duration
3	SM3B MISSION	12 days
2	BRIGHT EARTH AVOIDANCE (BEA)	12 days
1	HST RELEASE	0 days
41	NCS FILL PROCEDURE	2 hrs
40	8967V1 NCS01 START NCS CPL	0.3 days
6	NICMOS SAFED	0 days
8	8967 NCS01 NCS ACTIVATION & NICMOS COOLDOWN	0 days
14	8945 NCIMOS10 - NICMOS COOLDOWN DARKS	8 days
42	BEA COMPLETE	0 days
5	NICMOS COOLDOWN COMPLETE	0 days
7	NICMOS TO OPERATE	0 days
12	8945 NCIMOS10 - NICMOS COOLDOWN DARKS - PA	22 days
35	8944 NICMOS01 FW TESTS	10 days
36	8974 NICMOS03 - FLATS & QE	5 days
13	NICMOS TEMP SET POINT ADJUST	7 days
39	FILTER WHEELS ENABLED	0 days
15	8977 NICMOS06/07 - FINE OPT ALIGN	7 days
37	8973 NICMOS02 FOM OPTICAL OPERATION TEST	1 day
10	NICMOS TEMP SET POINT TECH REVIEW	0 days
9	NICMOS TEMP SET POINT ESTABLISHED	0 days
11	8977 UPLINK ALIGN/TILT PARAMS	0 days
18	NICMOS GO SCIENCE ENAB (BASIC MODES)	0 days
28	9269 NICMOS18 - THERMAL BACKGROUND	1 day
29	9269 NICMOS18 - PARALLEL THERMAL B/G	60 days
4	NICMOS EROs	6 days
32	8981 NICMOS10 - APERTURE LOCATIONS	1 day
34	8976 NICMOS05 - TRANSFER FUNCTION TEST	1 day
23	8988 NICMOS17 - ASTROM'C PERS'T'CE MEAS	1 day
27	8975 NICMOS04 - DET NOISE, SHADING, & CRs	1 day
24	8991 NICMOS20 - GRISM WAVELENGTH CAL	5 days
22	8985 NICMOS14 - FLAT FIELDS	1 day
25	8986 NICMOS15 - PHOTOMETRY	6 days
26	8987 NICMOS16 - CR PERSISTENCE	1 day
33	8982 NICMOS11 - PLATE SCALE	1 day
16	8980 NICMOS09 - FOCUS MONITOR	1 day
20	PRD SIAF, GAIN TABLE, ROT MATRIX UPDATES	1 day
19	8983 NICMOS12 - MODE2 TRG ACQ	1 day
17	8980 NICMOS09B - FOCUS MONITOR	1 day
31	PDB SIAF U/D & PATCHABLE CONSTS (512)	1 day
30	8979 NICMOS08 - COR'GRAPHIC FOCUS	1 day
21	8984 NICMOS13 - CORONOGRAHIC PERFORMANCE	1 day
38	NICMOS C'R'G'PH'C SCI ENABLED	0 days



Nutrient concentration tends to decrease from lagoon to ocean side



Nutrient	Location	Concentration	Pr>F
N	Lagoon	0.66	0.27
	Center	0.53	
	Ocean	0.40	
P	Lag		0.20
	Ce		
	Ocean		
K	Lagoon	65.6	0.08
	Center	32.5	
	Ocean	12.2	
B	Lagoon	0.38	0.19
	Center	0.29	
	Ocean	0.28	

Very important

Visuals Cont.

Emphasize key parts so that your points are stronger:

- Animate the graph or table elements
- Use drawing tools to highlight a portion of the table or graph
- Use strong contrasting color for drawing element
- Use callout box drawing tool

Closing

- Use a conclusion slide to:
  - Summarize the main points of your presentation.
  - Reiterate the relevance, the payoff.
  - Suggest future avenues of research.

Closing Cont.

- Include an appropriately formatted References page if necessary.
- Conclude with a Q & A.

Part 2:
Delivering Professional Presentations

Best Advice

- Relate to your audience.
- Come across as likable and trustworthy.
- Deliver your presentation with energy.
- Practice.

Performance Anxiety

Physical Components

FEAR

Eye Contact

Poise

Voice Quality

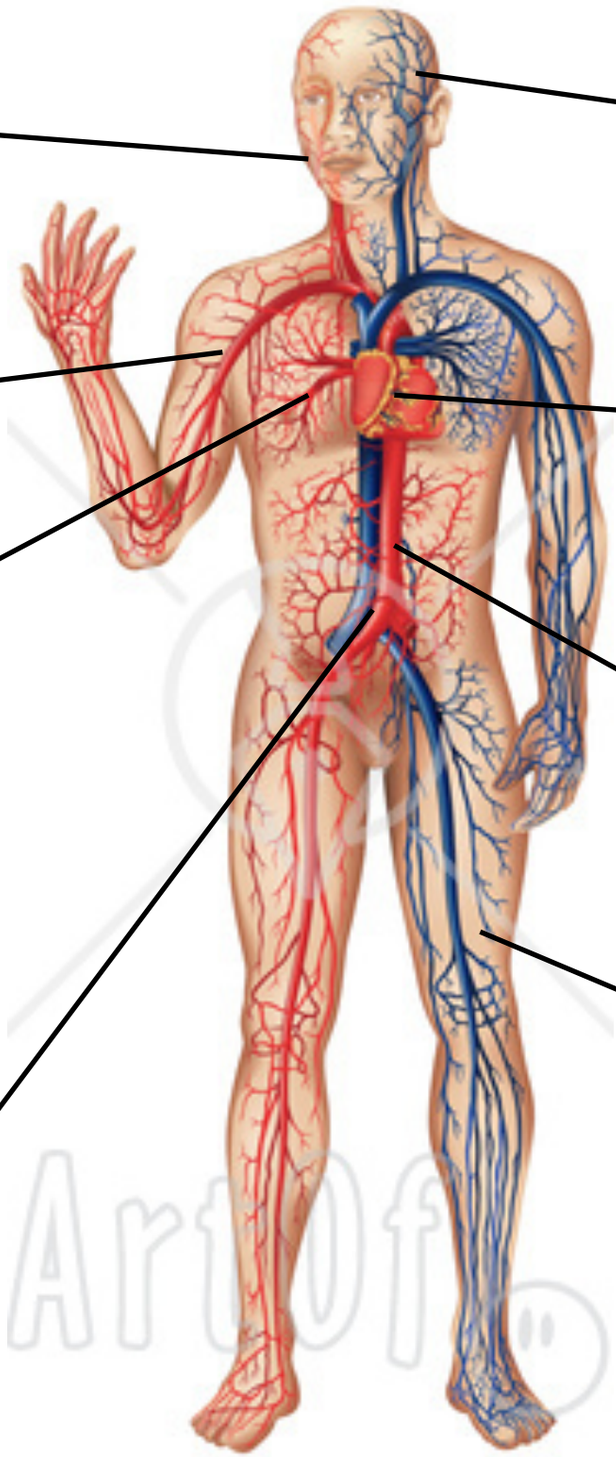
Adrenaline Effects

Dry mouth

Perspiration

Fast and shallow breathing

Urge to empty bladder



Interrupted thought processes

Increased heart rate

Stomach churns

Blood to muscles causes them to tense

Common Mistakes in Performance

- No eye contact
- Monotone delivery
- Speaking too fast
- Speaking too quietly
- Pacing, fidgeting
- Standing with your back to the audience
- Reading from slides
- Relentless pointing
- Going over time limit

Common Mistakes Cont.

- Speech disfluencies are credibility killers and include the following:
  - Repeatedly restarting sentences
  - Using these words: “like,” “so,” “you know,” “okay”
  - Using these utterances: “um,” “ah,” “er,” “mmm”

Managing Performance Anxiety

Tips for Managing Fear

- Know your material thoroughly.
- Record yourself and review your performance.
- Learn to pause and slow down.

Tips for Managing Fear Cont.

- Don’t drink coffee. Bring water.
- Arrive early; check your equipment.
- Anticipate and prepare for questions.
- Dress appropriately yet comfortably.
- Know what you can cut.

Tips for Managing Fear Cont.

- Practice
- Practice
- Practice
  - In front of family and friends
  - In front of the mirror
  - Using recording apps

Final Thought

It’s all about preparation.