Hello, everyone. We will start for everyone else to get here. So before we get started, okay, I think we have a lot to get through today, so I will go ahead and get started and I think some of your classmates will drop him as we go along. Welcome back everyone. A computer could long weekend. Believe it or not, this week represents the halfway points of, of our, of our class. These summer courses go by very quickly. I know. So while you have done less than half of the graded work for this course, because you're quizzes coming up next week. We are, or we will be by the end of his life in the middle of this week, about halfway through your meetings, that halfway through this sort of timeline of the class. I don't have a lot of announcements today. I just want to say that the grades for your first reflection essays were posted this morning alongside some feedback from the TAs. I have already heard from a couple of you who had questions about the feedback or who wanted some additional comments from me. If you are in that boat and you have not contacted me yet, please do so. The sooner you get in touch with me, the higher the chances are that I can get you some additional feedback or answer your questions in time for you to incorporate that into your next essay, which will be due on Friday evening this week. So feel free to email me if you have any concerns about the feedback that you got or the grades for your essay to, or if you just want to know more about what you what went wrong. And and How you can work on that for next time. I will get to as many of those as I can tomorrow. That will be probably the best day to get me in terms of me having time to give feedback and you still having a couple of days before the next assignment is due. So if it's possible for you to if you do have questions to email me either tonight or tomorrow morning, that will set us all up for as much success as possible in terms of discussing things as they need to be discussed. I'm happy to just review your essay and send you an email. If you want to set up a zoom call with me, we can do that to basically in lieu of offering regular office hours, I'm essentially making myself available for as soon chats with any students who want to talk about their essays or any other assignments in the class. And he said, You're next reflection essays are going to be due on Friday evening peak. That's all I have to say. In terms of general announcements, if anyone has any questions, general questions about the essays or any other parts of the class, I'm happy to take those. Now, I will give you some more details about the format of the quiz during Wednesdays class this week. I'm not going to talk about that today, but if anyone has any general questions about assignments or core stuff, I'm happy to take them out before we get into the material. So only a minute to see if anyone wants to talk about that. A question about the timing of the exact Yacco had Daniel Just so I was just wondering. You said that it's a take-home exam first when on its next week, Wednesday when we receive the exam. Yeah, that I'm going to figure that out and tell you on Wednesday this week, but you will probably I will do it such that you'll have I'm sort of all day Wednesday to work on it. So what Publicis helped posted at ten AM or something on Wednesday and you'll have until 10:00 AM on Thursday. To its dimension, it something like that. That's what I'm planning.  
  
Okay, thanks. Definitely, you will have it well before the official start time of our class. Because the idea is that if you wanted to, you could only use our official class time to complete it because that's what I would be doing a business if this was a face-to-face course. Any other general questions? Would I happen to know what the class average for the first essay looks like. I wouldn't know that I looked at it this morning and I'm trying to remember. So I don't give you any false information. I think it was a B minus. So somewhere in the 70% range, I think was about where the average was. I don't recall exactly, but it was definitely somewhere, someone have something somewhere between 70, 75%, I think sort of around 7072. Any other questions? And I will say that based on past experience, generally those average for these essay assignments goes up at least a bit on the second, third iterations of them. Sometimes some kinks to work out, especially in terms of citations and formatting for the first side, first rounds. So I would expect that I wish to go up a bit for the next 20 kay? Okay.  
  
For the questions about the quiz. Yeah. You have as much time as you want within that 24-hour period. I don't I don't want you to take more than two hours to finish it. That's not the intention of this, that you spend the whole day working on it, but there's no limits. That's no countdown timer that will, that will begin to count down when you open that test. So you could feasibly, you take the entire 24-hour period and only work on this if you wanted to. That's it. I really, really, really do not want you to do that. The purpose of giving you 24 hours is just to give people flexibility. If you have other classes or jobs or kids or other things that demand your attention that might prevent you from sitting still for an hour and a half or two hours and finishing it.  
  
Okay. I think that I will move on for now unless there are other questions right away. If other questions come up during the class and we can talk about them at the end. Ok, so today we're talking about ICTs, computer science, and gender. I know I've said this before about previous classes, and it's been true about previous classes, but it's extra true today. This is really an enormous area of study and there's so much that I could have had you read and so many different directions that we could have taken today's content. And this is necessarily because of the time and resource limitations that we have. Really just going to be a very surface level discussion of an enormous amount of material and a bewildering array of scholarship and questions and interesting students. So I know I've said that before, that's really true of every week of this class, but I really think that it's particularly true of today. And I do want to point out that there are other ways in which sort of this material could have been designed or other types of things certainly. But I could depend you read and focus on, I focused this class in a very particular direction, which is why today's lecture is going to be split up a little bit into two pieces. The first area that I'm going to talk about is kind of a general discussion of gender and technology. So gender and specific technologies, gender and specific artifacts or specific processes or specific techniques. And we'll talk about different relationships that might exist between gender and specific technologies or specific techniques, different ways that those two big categories of thing can work on each other and interact. This is why I wanted you to watch that brief video was kind of a primer to a small part of that discussion. However, neither of the text that you read for today is really focused on that set of questions. Both of the texts that I asked you to read We're really focused on why I tend to talk about computer science as a field a lot in this course. I know that both of these texts were actually more specifically focused on programming as a practice rather than on computer science as an academic field. But they're really both focused on the gendered history of the computing professions, that sort of history of computer programming, history of the sort of evolving definitions of skill and programming skills within this realm. And how those conceptions of computing skills have changed over time and what gender has to do with that story. So most of our discussion is going to be focused on that. But I do want to talk a little bit at first about gender and technology written large, because I feel like I would be this topic and injustice if I didn't talk about that at least a little bit in however, a kind of surface level way than I'm able to do in just a few minutes. So there are some obviously some huge questions that relate to the texts that I asked you to read for today and the kind of topics that we're going to be thinking about. Really big questions that I am certainly not going to offer you a satisfying answers to in the next hour, hour and a half or so. But these are the kinds of questions that the authors that you read for today are thinking about and exploring in their work. And the kinds of questions that I want us to be thinking about as we talk through this material. Firstly, you know, very large terms. How can technologies themselves relate to gender? What do these two enormous ideas, concept of technology and the concept of gender, has to do with each other. How did those ideas were late? And again, that's what I'm going to talk about for the first part of class today. For the second part of class, we're gonna focus on the next two questions, because these are the questions that genitive latte and Nathan ends. Men or are interested in and writing about in the text that you read. How is gender Important to the historical development of computer science or the field or the competing profession more, more, more generally speaking, and how does gender relevant today to computer scientists, professional identities? What is the relationship between our ideas about gender and our ideas about who is a computer scientist and what does a computer scientist or programmer. So the first question is going to relate to some of our previous discussions about technology and values. It's going to relate to some of what pollinate and Gil has said about technology and some of what other authors have said about technologies and politics, technologies and their potential to be political. And there will also probably be some tie-ins to future conversations that we will have in this course. In particular, the class on algorithmic justice that's coming up in a few weeks. In terms of the second set of questions, both of the texts that I asked you to read for today, our historical texts written by people trained as historians. They're both discussing some kind of change over time. And that's in part because both of these authors think, and I agree, that history has something to tell us about current transparent demographics, current ways of thinking in computer science. Both of the tests also talk about identity. They use agenda bottleneck in particular, talks about the power of metaphor to sort of shaped the way that we think about professional identities and the way that we think about professions and jobs. So we're gonna be thinking, or I want us to be thinking about the use of history to tell us something about current trends and current demographics. And I want us to be thinking about the ways in which we talk about gender and the ways in which we talk about computer science, and how that affects the way, the ways that we think about these things. And the people who are encouraged or discouraged from entering the field or practicing in that way. But as I've said, we're going to start by talking in very broad terms about how technologies and gender might relate to each other. So I want to start by, obviously, These are both really big terms. We've talked quite a bit so far in this course about what technology is, how the term is changed, what it means, what effect it has on our lives. We've not talked at all about gender yet. So first I want to draw some broad comparisons between these two braid large and very powerful technology, as Paul Knight and Gil has shown us. As Paul named Gale has argued, is part of our identity, is part of the way that we think about ourselves is through our use of technology, through the stories, the narratives that we can construct about ways in which we use technologies. Sort of part of defining ourselves as people is speaking about the ways in which we use tools, the ways in which we can use technologies to alter our environments to fit our desires and wants and needs. So technology is closely related to the ways in which we understand the world, the ways in which we understand ourselves. Plumbing, gill also argued, and people, other authors like Langdon Winner and Lawrence Lessig have sort of backed him up on this. That technology is something that has values embedded in it that is going to look different depending on the values of the person or team that created it. And might be used in different ways depending on the values of its deserts. And again, when I say value, I mean ideas about how the world works and ideas about what's important, that set of things that are valuable to us, that we think are vital and important in the world. Defines what our, what our values are. So Technologies or something that can have values embedded in them and can reflect values that exist in their creators or values that exist in the environment in which they were created. And use of technologies can reflect the values of its users. We've also seen that the idea of technology has changed over time. People's concept of what technology is and what it's for is not the same now as it's always been. And it's something that people can argue about, right? It's a contested term. Not everyone agrees about what technology, even Paul named Gail himself didn't end up giving us a simple definition of what this term was. He gave us six different ways in which he thought it was valuable for us to understand technology. And he explained some sort of some additional contestation as additional arguments that exists between sort of what he sees as bad or unhealthy or pathological ways of understanding technology versus a sort of set of alternative definitions. So we can say a lot of these same things about gender or race or genders, or in a very deep sense of part of our identity. The ways in which we understand ourselves and understand the world around us are deeply mediated by our gender. Understandings of gender are also things that have values embedded in them, right? Different cultures don't all understand gender in the same way. Different people don't all understand gender in the same way. And we all sort of have, we tend to have an innate sense of our own gender, personally speaking. But in terms of broader societal understandings of what gender means and what it does. He's can be very, very different and very much valued. Later. Our ideas about gender also changed, of course, and can also be contested, right? People can disagree about what gender means or how many genders there are, or how genders might be identified. And certainly the way that people understand gender can and has and will continue to change over time. So there is on a broad level, some comparisons between these two terms. And I want to talk a bit about the ways in which these ideas interacts, the ways in which gender into technology interact. Because the interaction happens in ways that also evolve, also change, and can also be contested. So to do that, I'm going to refer to a paper that I did not have you read. I would have liked to have you read this, but I didn't want to give you three long texts to read for one class. This is an article that I've assigned for this course in the past. It's biased scholar named Patrick Hopkins called the intersection of culture, gender, and technology. That was published as a chapter of an edited volume of an edited book in 2009. So what Hopkins does in this chapter is layout for different ways that he thinks gender and technology are, can interact with and with each other for different ways. That gender and technology in a broad sense, can be related for different relationships between these very big concepts. So what I wanna do for the first part of class is go through what Hawkins says about these four different kinds of interactions between technology and gender. The first way that he talks about the interaction of these two terms, he just calls it Technologies association with gender, which sounds very broad, but he uses broad terminology because he's talking about this in a broad sense. He says the, the concept of technology, the way that we think about what technology is, is itself embedded in a kind of gendered framework. He says that in Western cultures, men have historically been associated with technology. Well, women have more typically been associated with nature, which we tend to perceive. Although husband says he doesn't agree with this perception as the opposite of technology. So she's saying that we tend to view men and women, male and female as a dichotomy. And that there's a kind of overlapping dichotomy of technology versus nature on top of this man woman dichotomy. Now Hopkins doesn't agree with this sort of polarization of nature and technology. But he's saying that this is a very common way to view the world. The statue that you see on this slide is I forgetting the exact title of it, but it's called something like nature unveiling herself to science. It's a statue that was created towards the very end of the 19th century. And it depicts a sort of a fairly common view, at least common in Western cultures, of nature as feminine. In this particular piece of art, nature is represented by this woman who was literally unveiling herself, literally sort of supposing her secrets to science. The idea being that the sort of the scientific and technological world was going to discover on everything that nature had, had to offer. It was going to sort of peel off these layers and reveal the secrets of nature through technological progress and scientific discovery, sort of driving home this association of nature with feminine. And although there's no particular representations of science or technology in the statute itself. The implication is that it is the lens of science, sort of through technological progress that is causing this unveiling to happen. So hopkins sends that thinking about technology and nature and sort of masculine and feminine. In this image. In this time in this way, later in these dichotomies on top of one another, as he says, tends to influence assessments of technology and gender in particular, and often contrary weights. So for example, he talks about the fact that we tend to ascribe us Seidel progress, technological development, right? This is something that we've talked about before, that there's a sort of a popular view, a strong link between the idea of societal progress and technological progress. And that if we sort of tend to understand technology as a masculine or technological development as a masculine phenomenon and the myths associated with men. Then there's sort of an ending. And according tendency to understand progress, societal changes, something that's driven by masculine endeavor or something that is sort of male dominated, which can be expressed as a good thing and a bad thing, right? We can valorize this kind of technological progress. We can talk about thinking about how it's pushing us forward into a bright new future. Or we can sort of vilify it, right? We can talk about how the detrimental effects on the natural world that have occurred through unrestrained technological progress. So this is not, he's not necessarily making a normative judgment here. He's not saying that, you know, necessarily better for men and worse for women that we think about things this way. But he's pointing out the sort of popular Association of technology with masculine ideas and sort of dichotomy between that end up kind of fit feminized nature. He also says that this way of viewing the world ignores how a lot of traditionally feminine activities, like different kinds of housework, for example, are infects technological in significant ways. There's a lot of women's use of technology and a lot of technologies that we think of as feminine. But we don't sort of, we don't sort of tend to group under, you don't tend to think of as technologies. In the same way, we think about household tools, tools that are used to conduct housework. We tend to think about these things like a dishwasher or an iron or something like that in a different sense than we think about a lot of other kinds of technologies. So his first argument, which again is very broad and not, I'm not going to be maybe incredibly relevant to the rest of the discussion that we'll have today. But nonetheless important to think about, is a kind of general association of technology with gender in certain ways. After this, he gets a little more specific. So he says, the second way in which technologies and gender relate to each other is that technologies themselves, individual technologies can reinforce gender systems. So by this he means that technology's specific technologies are use of certain technologies. Marketing of certain technologies can reinforce sort of existing gender roles and existing gender stereotypes that already exist in our society is so technologies that are built in an environment that has sort of gender bias and gender stereotypes within it tend to reproduce those same stereotypes and gender biases and can in fact have an exacerbating effects, can reinforce those biases or stereotypes or norms that already exist sort of through dissemination and use of those technologies. So very Simplistic example of this is if we think about toys, right? These are the results of Google image searches for toys for girls on the left, and toys are boys on the right. Again, at a very simplistic example, but one that demonstrates this first part of what Hopkins means by the idea of technologies reinforcing gender systems. Gender-specific toys like the ones you see in most of these pictures, can encourage children to reproduce or to model particular gender roles are particular stereotypes, right? If we look at the toys for girls, we see a lot of them are domestic in nature. You do have a pink bow and arrow there, but the rest are mostly sort of toy kitchens, doll houses, things like that, toys for boys. Aside from having a very different color pallet, sort of invoke a different set of activities and sort of normalize a different set of things for, for, for boys to be doing. So we can look at things like technological toys as reinforcing gender stereotypes that already exist in the world. That's not the only way that Hopkins talks about this reinforcement occurring. So the previous example was about technologies that were designed for use by specific genders. Both the pictures on this slide are advertisements for technologies that in general sense are used by people of all genders, all the time, cards and pens. But another way of sort of aspect of technology reinforcing gender systems at Hopkins talks about is how the way that we think about how people of different genders use technology can also reinforce or reproduced stereotypes. So these are two advertisements from two very different eras. The car out is a lot older than the pen at is. If we look at the car ad, you'll see that this is a cod and advertisement that is attempting to appeal to men and women. It's advertising one kind of car and trying to point out how this car is going to please everyone or just cars, you know, perfect for families because it has aspects that are going to appeal to women and aspects that are going to appeal to men. If you look at the categories that they have nicely and clearly divide it up for us. Here we see that in order to make the car appeal to women, they're trying to emphasize its comfort there, trying to emphasize the way that it looks. They're emphasizing the fact that it's easy to use, it's easy to adjust the seat. It has sensible doors that are easy to get in and out. Oh, but I'm not going to be dangerous for children. It's simple to change the gears. There's a big trunks that you can keep lots of stuff in it, right? These are all emphasizing comfort and ease of use. If we look at the other side of this from the aspect of this car that are meant to appeal to men are sort of more traditionally technological or they're kind of, they're more techie. They have to do with the perimeters of the car. The car gets more miles per gallon. It has good accelerations with powerful. There's still some concession to safety. Rate tells about the safety of the braking system, but a lot is about the way the car handles, the kind of pleasure that you might derive from using this technology. And if Penn, the power and efficiency that are associated with it. So here we see a different example of one technology. Advertisement for that technology trying to appeal to people of different genders by emphasizing very different aspects of the same thing. The pen cases, different vistas. Being now infamous big for her pen, which came out a few years ago, was essentially the same as other pens that were made by big, except it was sparkly and it had a sort of comfort grip and was also significantly more expensive than other pens at pixel. So this sort of became an Internet laughing stock cautionary tale of gendered advertisements on quite a different case than the car example. Same idea though of sort of taking a technology that's used by everyone or by, you know, lots of different people have different genders and trying to emphasize certain aspects of it that are meant to sort of appeal to a stereotypical female user. More ways in which technology might reinforce gender systems. And this one is a little more subtle. So the previous cases where about advertisement, right? About the way we talk about technology or in the case of the pen, the way he might make sort of superficial design changes to something that would not necessarily change the way that the technology function, but the way that it looked and perhaps something about the user's experience of it. Another sense in which technologies might reinforce gender systems is when the environment that the technology was designed in, the standards upon which it was based, had a kind of unintentional and unidentified gender bias to them that resulted in a, in a, in a, in a, in a product, which in turn reflected that bias somehow. This is more along the lines of the examples that that video that I posted tried to demonstrate sort of cases where the people who created a technology we're not aware of or sort of didn't devote enough time to thinking about how they were designing their product and how there may be sort of unnoticeable or unintentional gender biases ingrained in the products, the design, somehow, this is the case with this article, which you may note is written by being a boy who wrote one of the pieces that we read last week on a very different topic. She tells a story of how this occurred or may have occurred in early designs for the Oculus Rift virtual reality headsets. I, I will note here that the design of these headsets in particular has changed a bit since she wrote this piece is from 2014. So not all of her arguments are necessarily valid in the same way that they were then. But her basic point here is relying on something that's still true and still documented, which is that women tend to be more susceptible to men than men. Motion sickness, that is to say some people when they put on a VR headset, will feel motion sick, well, sort of feel ill enough that they're often not able to continue using it. In some cases, this can happen very quickly. Within a few minutes of putting on the headset. Some people will sort of notice after using it for a while that they feel ill. But this is a documented sort of effect for some people of using VR headsets. And there's a documented gender disparity within this, within this set of people who experienced VR sickness, women are much more susceptible to it than men are for reasons that are not entirely clear. There are some different research hypotheses about why this is the case. Some people suggest that it may be due to hormonal differences, but a lot of the explanations come down to field of view. And something called inter pupillary distance is essentially the distance between your eyes, the distance between the pupil each which on average tends to be different for women and men. So the, one of the arguments that void is making in this piece and that others have made about the Oculus Rift and about other brands of VR headset, is that in the early models at least, it was impossible to adjust this inter pupillary distance. You couldn't sort of change the way that the machine read or to continue took into account the distance between the eyes. And that this distance had been calibrated based on an intended user base that were reflected sort of male average I distances. And that maybe this was part of the reason why women tended to get sick more frequently as a result of using a VR headset. So she hasn't intentionally provocative title for this article. She's not in fact suggesting if you read the piece, that there was intentional sexism or intentional gender bias that went into this design. What she's saying is that this design was created based on a set of standards, of biased set of norms. And that this internal resulted in some unintentional gender bias in the way this product on its user base. This is a very similar case. This is something that was mentioned in the video for those of you who were able to watch it. The idea again, a kind of standards and norms based argument about gender and technological design. This one about crash test dummies in particular. So the original crash test dummies that were used to test cars abort had a certain set of dimensions to them. He's dimensions came about because the original design for car crash test dummies were based on crash test dummies that had been produced for use by the US military and the Air Force in particular, the first crash test dummies that existed. We're used by the US Air Force to test the designs of their fighter planes. Now, because of the time at which these early dummies were created and the demographics of inforced pilots at that time. The original crash test dummies that were created for, for that for the Air Force use were designed to reflect not even a typical male body, but the typical body that flew the planes, which was a male body of a very particular size. But you had to be within a sort of height and weight and body dimension set of restrictions in order to successfully pilot one of these planes at the time so early crashed us dummies were created, certainly not to reflect women's bodies and not even to reflect the majority of male bodies, but to reflect the very particular subset of bodies that we are going to be flying these planes. Not so much of a problem for the planes in particular became more of a problem when these same sort of sex of dummies or same set of questions. Dummy norms and standards was adopted for use in automobile testing, a technology that's obviously much more widely used than military fighter jets. So the video made a brief mention to it. If you go to the website that is sort of that the people who made that video, our behinds called gendered innovations, they tell a more in-depth story about how this sort of, this bias set of standards was used to create crushes, dummies for decades, and was only sort of very slowly and reluctantly modified to accommodate different types of bodies, female bodies in particular, and eventually pregnant female bodies. So again, an example of unintentional gender bias resulting from a technology being produced within, within a bias environments or on the basis of a bias norms that in turn had detrimental effects for eventual users of that technology. Okay, that was a very long explanation. The other two will be much shorter. Third Way which happens, talks about technology and gender relating to each other is the idea that technologies can subvert gender systems, right? So it's not all, he's not only telling kind of doom and gloom stories about technology and gender biased, he's also saying in addition to sort of reinforcing stereotypes, technologies can subvert stereotypes too. Technologies can have beneficial effects. Technologies can open new ways of thinking about gender, can open sort of new social or cultural pathways for people of different genders to in the world. He gives a few examples of this one. And this one of them is the advent of indoor plumbing, sort of removing the labor of water gathering from, from societies in general, but particularly from women, as sort of water gathering in many cultures has tended to be a feminine endeavor, something that women were responsible for. Hopkins writes about how the addition of indoor plumbing to households rendered this particular task unnecessary. And it changed our ideas of it sort of made the acquisition of water and no longer a particularly feminine tasks. And that's one example. He also discusses things like the power of technologies like transportation technologies and communication technologies like radio and television and internet to facilitate knowledge sharing between people and between cultures. To allow for increased access of information, to allow people to have new experiences, and to challenge stereotypes. And sort of through this exchange of information and exposure to different ideas and ways of thinking, sort of allowing the potential for subversion of gender norms. The final way in which Hopkins discusses internet interaction of technology and gender is when he talks about the power or at least the potential of certain technologies to change our understandings of gender and sex. To sort of change our understandings of what gender is or what biological sex is. Or to change our understandings of sort of rolls of different genders or propensities of different sexes. He writes that new technologies can allow us to alter our bodies and to change our biological characteristics in ways that challenge our current understandings of gender. And basically you saying that technologies change our understandings of our own biology. They've can change our relationships to our biological cells. And that can include alteration of RF understandings of what gender or even biological sex art. So he includes in this discussion existing technologies or existing techniques, things like reproductive technologies that can change the nature of pregnancy or the nature of procreation. Things like gender confirmation surgeries for transgender people. He also talks about potential future practices or future techniques, future technologies that don't exist yet but may in, in the future, like cloning, genetic engineering, the creation of cyborgs or AI as that exist in a kind of post gender state. So he starts off by talking about a very basic level, about how our understandings of technology had been mediated by the gendered world that we live in. He talks about, I think, something that we hear a lot about, the ways in which technologies can reinforce or reflect existing norms or existing gender biases that exists in the world. He also talks about the potential for technologies to help subvert those biases and norms. And he talks about in a current sense and a future forward-looking sense about how technologies can change or helped to change our understandings of what gender and sex are and how they work. So again, I know this was an exceedingly brief discussion and we may revisit some of these ideas during future classes. But for now, we're going to shift our focus. For the rest of the class. We're going to shift our focus from that first question about how technologies themselves can relate to gender to the next two questions about computer science as a field or computer programming as a profession. The computing professionals more broadly, the histories of those professions, and the ways in which gender interact and has interacted with those changing fields, changing professions, and changing professional identity. So from those really big questions, I want to move to some slightly smaller questions. These questions are so large, but they're perhaps a bit more answerable for us or for you on a personal level. And these are questions that a bazillion ends manner are themselves engaged with. Their questions of the text, texts addressed. And they are questions that I am going to ask you to further engage with during the mini assignment for today's class. So we're not going to, I want you to keep these questions in mind while we talk about the readings. And again, I'm going to ask you to come back to them and think about them some more when you're doing your mini assignment for today. What makes a good computer scientists, a good programmer, or a good computing professional? What's, what, what skill set, what kind of traits make somebody good at these professions or sort of give someone the skills to succeed in these fields. What stereotypes about computer science, computer scientists or computer programmers have you encountered as students in these fields? I'm sure you've encountered many of these, some of which you may agree with, some of which you may not. Agree with. And finally, how might these stereotypes relate to our perceptions of what it means to be an effective computing professional. And what does all of this have to do with gender? This last one is really, or these last two are really the questions that both about a and ends min or are trying to address in their own ways and the pieces that they wrote for today. So I did ask you to read these two pieces. I know they were both a bit long, so I hope that you were able to get through them. The first one that we're going to talk about is Janet aboutus texts. It's called Seeking the perfect program. And this is one chapter from a book that she wrote called recoding gender. The book was published in 2012. The subtitle of the book, I believe, is a women's changing participation in computing. So she's interested, excuse me, throughout the book she charts on historical shifts in the participation of women in computing. She's interested in demonstrating how women have participated in computing professionals in different ways at different times. How sort of what the, what the trends have been throughout the 20th and the beginning of the 21st century. In terms of what women's participation in computing. She's not only interested in answering this sort of perpetual question of why aren't there more women in computing? Xi is, of course, I think, interested and spurred on by that question, but she's really doing more than that. And we'll talk about in what sense is she's sort of attacks that problem in a minute. And his manners piece is a slightly more recent. It's an article from 2015, but he published called beards, sandals, and other signs of rugged individualism, masculine culture in the computing professions. So again, he's interested in the same subject area on both of these folks are trained as historians. As I said, both of them are, have written historical texts. They're both based their work on our archival data as well as secondary sources. They're both telling us something about change over time. They're both talking about the participation of women within computing jobs. And they're both talking about sort of changes in professional identities within these fields. The beginning of N's mangers article is quite similar in some ways to what a Bottega saying. So you may have been wondering why I asked you to read both of them. I asked you to read both of them because by the end of his piece ends May or comes to quite a different conclusion than a body does. And I'm not saying that he disagrees with what a buffet says because he doesn't, but he's, he's taking his arguments in a very different direction. A b2 is interested in this chapter primarily in demonstrating something about the ways that people thought about programming skills during the period of time. And she has taught me about ends. Mentor starts in a similar place, but what he ends up arguing is something about how the masculine identity of the computer programmer or the computer hacker or the competing professional was established throughout the 19 seventies and 19 eighties. So they both start in a kind of earlier time period. They both start by talking about the 19 sixties and seventies era where programming skills were very undefined with a computing profession was still undefined. Well, lots of ways, but by the ends of their, of their texts, they end up in quite different places. Again, not opposing places, but they're just making different arguments. And I think they're both interesting and that's why I wanted you to be both of them. So before we get to a botched his text first and then ends megawatts text. Afterwards. I wanna talk about a little bit of the history of women's participation in computing. Estimator gives us a bit of this. So some of this is going to be a recap of what he says, something that you may already be familiar with from other sources. But there is a long and significant history of women's participation in computing, which I want to make sure that we've highlighted before we go on. Some of you may recognize this image as a portrait of Ada Lovelace, sometimes referred to as the first computer programmer. She lived in the first half of the 19th century in England. She was a mathematician and a writer. She was very wealthy and privilege. She was the daughter of Lord Byron, famous poet, Lord port port biomass. So she had a very, very privileged and very unusual upbringing, especially for a woman at the time. She is sometimes called the first computer programmer or the first software engineer because she was the first person to publish what we would now consider to be an algorithm that was intended to be carried out by a machine. The machine that she wrote this algorithm for did not physically exist. At the time. She was doing theoretical mathematical work. She was basing her work on the analytical engine that was proposed by Charles Babbage. This was a machine that he's sort of proposed in the 130s and built a part of it, but then died before he could fish, but creating a full prototype of the machine. So there was this mechanical computer, this analytical engine that had been proposed and partially built. And ellipsoids designed a program that was intended to be carried out by this machine. First case that we know of, of someone doing something like that. So within the kind of early Prado history of computer science, women's involvement existed. If we move on a little farther to some kind of larger scale and maybe more practical examples we see throughout the beginning of sort of pre-history and early history of digital computing. Very significant involvement by women as well. Some of you may know that the term computer has not always referred to a machine. The term computer for a time in the 19, thirties and forties and fifties was a job description. So a person could be a computer, a computer with someone who performs complex mathematical calculations. And this was seen at the time was kind of not high-valued academic work, but as relatively lowly clerical work. That was maybe certainly difficult and couldn't be done by everyone. But it was something that was mechanical, wrote something that was not a particularly high-status or particularly well-paid job. And as such, this kind of work with often done by women. So if you've seen the movie Hidden figures on the type of work that Tim Keller calculation of work that the women in that movie were doing was the kind of work that would be done by Human computers at the time, Katherine Johnson, who needs you. The picture up on the left of the slide here was one of the women upon whose life story that movie was based. She was a computer, she worked at nasa. She was a mathematician whose orbital mechanics calculations were critical to the first US manned space flights. So the term computer originally referred to a person who performed these complex calculations by hand. As digital computers began to be developed, the fact that these calculations began to be done by the machines instead of by the people directly sort of led to this change in the way the term was used. So many of the people can first program these massive early digital computers, like you see in that middle image here, were also women. Because the human computers who had been performing these calculations by hand often moved on and sort of became the initial programmers are the initial operators of these machines. This was not exclusively done by women, but there was a sort of a large degree of women's participation in that kind of work. On the right of the slide here, you see a different picture from slightly later on. This is the picture of Margaret Hamilton, who was a computer scientist and a systems engineer. She coined the term software engineering. She also worked at nasa. She sort of, she led the efforts develop onboard the flight software for the Apollo moon, moon missions. And she's pictured in this photo scanning beside a stack of printouts of code that you wrote that helps send American astronauts to the moon. So I mentioned all of this partly because nth men are tough about it in his piece that I wanted to highlight that part of it. But partly because I wanted to give some context for graphs like this one, which sort of attempt to demonstrate change over time in women's participation in computer science. This graph only begins in 1965, so it's missing. You would see sort of a more, a decline from a slightly higher level. And if it had started earlier and had included the type of work that was outlined on the previous slide. I will say this chart is based on American data, is based on data from the National Science Foundation, the American Bar Association, and the American associate Association of Medical Colleges. But we see very similar trends for Canada and for a lot of other Western countries. Namely that after an initial sort of period of some participation from women in computing fields, we see this decline throughout the 19 sixties and then throughout the 19 seventies and early eighties as legal and social barriers to women's education and various career options were gradually removed. We see a sharp rise in the number of women who were getting degrees and jobs in computer science, as well as in medical school, law school, and the physical sciences. These numbers go from very low in the kind of five to 15% range in the early 19 seventies on two, by the year 2 thousand, somewhere between 40, 50% in medical school, law school, and the physical sciences. However, in computer science, we see that women's participation, or at least the number of Getting degrees, which is what this chart is showing, peaks in the early to mid 19 eighties and then declines after that. We see a similar trend and engineering, although it's not as strong as it is in computer science. So the question that a lot of researchers and a lot of academic spent, a lot of sort of people who work at universities are left with is what happens here. Sort of what is the explanation for this trend? What is it that has differentiated computer science and these other professional fields like medicine, law, and other branches of science, where the trend in terms of women becoming and staying involved in the field looks markedly different. What is the explanation for this graph? I do want to point out before I get to about a and ends mangers explanations for this that on first of all, that this is something that has been a relevant topic at Concordia recently. A lot of the rhetoric around janet Co2 use donation. And the subsequent renaming of the school was centered around the participation of women in engineering and computer science. And what an important symbolic and practical move it was for the school to be named after a woman. I also want to point out that this is not a worldwide phenomenon. You have this graph that I showed is not the same everywhere. And certainly the reality in Canvas similar to the one that the US data shows here. But there are plenty of countries in the world where this decline didn't happen or where this sort of graph shows very different realities. Countries like India and Malaysia, as well as many other places are countries where computer science and computing careers are seen as very normal and suitable and unsurprising for women. And where the percentages of women who were involved in them are also very difference. Now, in some cases, because computing and careers can involve being indoors and away from physical labor, which of course comes with its own set of gender assumptions about what kind of person ought to be performing different professions. But I do want to emphasize that a particular set of trends is not a worldwide or a universal phenomenon. So both authors, however, that you read for today, are in one sense interested in explaining this graph that we've just seen. But they are not only interested in doing that, they're also interested in sort of explaining the shift in our understanding of what a computer programmer looks like, right? How a computer programmer and the popular image of such went from somewhere around the picture on the left to somewhere around the picture on the rate throughout the 20th and early 21st century. So I'm gonna start with gen of botnets article. She is mainly arguing about programming skills and how, how employers, organizations sought to define programming skill. Mostly in the 19 sixties and 19 seventies now. So she starts off by sort of making this very fundamental statement. This statement is the basis of the rest of her argumentation. So if you don't buy this part, if you're not on board with her here, you're going to have real trouble with the rest of the case that she starts off by saying skill is a social construct. Neither the skills required to do a job nor the skill possessed by an individual can be defined in purely objective terms. So if you recall back to a couple of weeks ago when we were talking about the social construction of technology. And sort of the theory that's put forth on, that seeks to explain how specific technologies can be socially constructed based on people's needs and problems and desires. A bump things make you very similar argument about the idea of programming skill. She says there's no one way to define the skills that are required to do a certain job. Nor is there any one objective way to sort of measure the skill that any individual had. It, she says there's no objective way to do this and that therefore our understandings of the skills that one needs to do a job and our understanding of the skills that an individual person possesses are going to be necessarily socially constructed. Somehow, our values and the social environment that the job or the prison exists in is going to influence our perception of what skill is what skills are important, what skills a person has, what skills are necessary to do a certain job? And this is where she starts, and this is what she's trying to show in this chapter is essentially the social construction of programming skills as it occurred throughout the 19 sixties and seventies. Just kind of demonstrate how our ideas about what someone means to be a good programmer. We're, we're influenced by various factors. And she's also trying to demonstrate the kind of influence of gender or the effects of the social construction of programming skill, gender throughout this time period. And so this is her, her, her, her, her aim here to demonstrate that construction of programming skill. And she talks about a number of aspects of this, right? She talks about how at a time when there were relatively few or sort of beginning of the time period. She's talking about. No real degree programs that were intended to train programmers or few of them. There was a need for companies to define the skills of the people they were going to hire to do programming work. But no kind of approved set of credentials that people could be coming in with, that would be an automatic qualification. So in the, in the absence of a widespread Computer Science degree programs or sort of official computer programming training courses. How it was an employer to decide whether they were, how to find a good programmer to hire. And she talks about some ways in which people tried to do this. She talks first of all about some ways in which people sort of tried to differentiate programming skill from other things. Attempts to sort of separate out the planning part of a programming job for me, execution of it. So the systems analysis part of completing a commuting past versus the programming part She talks about differentiations between hardware and software and the idea that sort of programming skill could be defined in these different areas or but we can talk about different on different types of programming skills are like a hierarchy of programming skills where the sort of more theoretical systems-based analysis tasks being like a higher level type of work versus a more menial, more applied and more roads kind of programming skill. And then she talked at some length about different is practical ways in which people tried to assess their potential. Programmers write it different ways in which people tried to develop proxies for programming skill. If you as an employer didn't have the time or the resources to sort of just watch somebody actually do programming for a while to figure out whether they were really a good programmer or not. What kinds of other measures could you use to try and predict how could it be a programmer they would be. So she talks about attempts to use college degrees to do this. She notes here that there were very few degrees, as I said, that we're actually in computer science or in some kind of programming related steel. So she discusses companies attempts or willingness to use various types of college degrees, or even sometimes any college degree as a, as a, as a proxy measure. The idea being that on any kind of college degree would demonstrate a capacity for some kind of critical thinking, some kind of problem-solving skills, some kind of attitude that would be somehow applicable in a programming environment. She talks about the idea of previous work experience. You know, even how, even though this was in relatively short supply, because the number of programming jobs had boomed in recent years. The idea that once somebody who had had an initial degree of work experience in a programming job that was sort of sufficient as a proxy measure for them to get future programming Johnson to continue to work in the field even if they had no official credentials to back it up. And then she talks at some length about the introduction of aptitude testing, right? The idea that you could come up with some kind of logic tests that you wouldn't have necessarily needed any particular education to rate, which would be in some sense a measure of how good a programmer you would be. So she discusses these three different approaches that were sometimes used by different companies to try and evaluate people's programming skill. She discusses how none of them were perfect. Sometimes they weren't even good. You know, there's a limit to the amount that a college degree in any field can tell you about someone's programming attitude. Even these aptitude tests in particular, she says, tended to reduce programming to a very particular subset of skills. And that, you know, you could be very good at this test and still not be an excellent programmer. Or people's test results didn't necessarily correlate to that. The degree to which they were actually found to be good at their job. But she discusses use of these different attributes, different measures, to try and figure out a way to evaluate how good, how successful a programmer, someone was going to be. Xi then sort of moves by from talking about these different proxy measures to talking about metaphors that people and companies use to try and define what they wanted in a programmer. And this is what she's saying here. She's making that move from talking about practical attempts to define programming skill to metaphorical ways of thinking about what programming was. So she's as another way of uncovering the social basis of skill assessment is to look at how employers drew connections between programming and more familiar occupation. So how they would connect programming skill to other jobs or other practices that were already more well-established. Depending on the comparison, chosen programming might appear high or low status, abstract or concrete, creative or routines. So she talks about all these different ways that people would describe programming work, different metaphors to print comparisons that they would use. And what he's trying to demonstrate is that depending on the comparison, which could sometimes be a quick, arbitrary choice, you could be saying very different things. But what a programming job, what's right? You could be communicating that this was a very highest job that would presumably high pay and sort of social benefits associated with it. Or that it would be a kind of low menial, sort of maybe not very exciting, are not very interesting position. You could be demonstrating that programming was going to be very abstract and very theoretical, mathematical, or very concrete, very specific, very problems focus. You could imply that programming required a lot of creativity or that it was a kind of very routine mechanical job. So again, she's saying that really the type of metaphor that companies and, and, and advertisers and people chose to about what programming was and what kind of skills they wanted from their employees could represent this task or this profession in very different ways. So she talked in particular about three different metaphors that were commonly used to describe, describe programming tasks or to describe programmers themselves. The first one of these is a kind of mathematical metaphors, so the representation of programming as mathematical problem solving. The second is the idea of programming as men managing a device that had been engineered. So this is what she calls an engineering metaphor. So in contrast to the mathematical metaphor, which would imply that a programmer would need that sort of high logical attitude. Maybe a degree in mathematics, sort of very advanced theoretical capabilities and engineering metaphor for programming represents a programmer is someone who manages both hardware and software. Someone who doesn't just need your medical expertise, but it needs some understanding of machinery. Also someone who's going to be managing the entire device of a computer and not just creating code for it, not only writing software. Finally, she doesn't want a business metaphor for programming. Whereas wherein programming, Java programming skills were represented as kind of an evolution in business. Technology. And she talks about different ways in which this happened, right? She talks about there being a kind of managerial business metaphor where in programming was representative, something more high-status and the kind of clerical business metaphor wearing. Programming is something that is more routine, is necessary to the function of an office, but not very creative or abstract or exciting. So within this business metaphor, you could sort of have higher status, more abstract, more creative representations of what programming was. Or you could have more low status, more concrete, more routine and more sort of not mechanized, but yeah, more routine, more more, more clerical understandings of what programming was. She also talks about how this is what she brings gender into. What she talks about how these different metaphors sort of allowed or restricted women's participation in computing in different ways. This is what she means hearing when she says that the characterization of computers as an engineering tool, a mathematical device, or a business machine mattered greatly. Constructing females as possessing the skills necessary for programming. So if you were imagining a programmer is someone who's going to manage both hardware and software. You might imagine a very different set of skills that would be necessary for that job. And you might have different gendered assumptions about the type of person who was going to be most capable of turning out that job. That would in turn be different if you were imagining programming as inherently mathematical or as sort of management, some kind of business practice. So she shows up both positive and negative examples. So a bucket is really not interested in making sort of simplistic statements about this metaphor was better for women, or this one was more sexist. That's not really what she's doing. She's showing how these different ways of representing computing work could intersect with gender in different ways. And she does want to, she's very concerned with showing us positive examples. She doesn't want to say that despite the various institutional challenges of the 20th century, there were many cases where women could ended successfully entered into computing professions. But there are also lots of environments. But women can it be excluded from sometimes in very explicit, obvious ways and sometimes in much more subtle ways. So in terms of positive examples, she talks about sort of promotional pamphlets that were created by IBM. This is not from the pamphlet in particular that she talks about, but this is the profile of women who worked in different computing fields. Themes like this could sort of showcase the ability of women seed in various different competing professions. They might show women carrying out multiple types of programming jobs, multiple kinds of computing work, and demonstrate that the sort of career pathways work possible through multiple different computing metaphors, multiple different understandings of what programming was. There were other cases or other metaphors or other contexts that were more difficult, that were much more masculine, lies that were harder for women to enter, enter into. She talks about academic computer science as being one of these spaces, right? The idea of programming as science, programming as intensely mathematical programming is very academic, could make it difficult for women to enter the field. Because not so much because of the nature of computer science in particular, but because as ends manner also points out in his piece, because kind of the nature of academia at the time, because this kind of sort of scientific laboratory atmosphere was a very masculine IS space. And the fact that the fact that the laboratory was chaotic computer science research didn't change that kind of fundamental masculine identity of what a scientific laboratory did and who were the people who participated in it? She also talks about how the kind of engineering metaphor, the idea of could have mastery of the computing machine also tended to have this sort of masculine bias to it. This is an advertisement not directly from the article, but similar to ones that about eight talks about that demonstrates competing as an engineering task. This is an ad Burroughs Corporation research center seeking programmers, pointing out at the top that brooms always needs good engineers and identifying the sort of potential of, of programming skill combined with the power of the machine by saying that man plus a computer equals a giant. Commission would contrast ads like this that are gendered in a very specific way to add some represent the kind of more clerical business nature of computing that a gendered very differently, which you can see here, right. These are also adds meant to encourage people to apply for computing positions very, very different from this one. So this one on the left is demonstrating the power of this typist to control your invoicing stuff, records and sales statistics, statistics all at once electronically with the help of her computer. So again, this is demonstrating a computing profession. It's demonstrating a certain kind of gendered participation in computing. It's demonstrating kind of feminized skillset and the representation of computing professions as something that are open to a particular type of person. Similarly with the one on the rate, similar kind of advertisement. This one is an ad for a technological system rather than a computing job. But again, it's sort of representing computing work or programming work as a clerical task, something that is easily done, something that is necessary to the function of an office, into the function of a certain bureaucracy, but isn't necessarily high-status or creative or abstract. Third example of a kind of similar case. Again, visit an advertisement for a computer itself and not for, not for a job. But you can see sort of similar themes of ease, ease of use, and sort of gendered representation of the person who was going to be operating this simple machine and the kind of tasks that that person would be conducting with it as composed to this kind of representation of what computing work was. So she then sort of come, complicates her own points a bit after sort of devoting some time to explaining how the sort of business clerical metaphor for computing professionals, I rendered the sort of job landscape more open to women. Had things like the engineering metaphor can make it more difficult for them. She complicates her own argument by noting that as she says here, the conceptual categories of skilled work and women's work were not mutually exclusive, but rather existed in an ambiguous tensions. So she shoots, just talking here about some different metaphors of alternative metaphors for computing skill and that were maybe more welcoming to women, although not as dominant as the kinda mean. Three metaphors that she identifies, she talks about on advertisements or recruiters that would tell people that if they knew, would admit that could be a good programmer or ways of viewing early computing technology as baby technologies that needed some kind of mothering in order to be able to grow. So she's painting a complicated picture here. She's not making simple arguments. She's trying to demonstrate the complexity of skill metaphors and gender participation that existed around computing professionals throughout the 19 sixties and seventies. Yeah, so she's contrasting the kind of three metaphors that she identifies as dominant, namely mathematics and engineering, and business. With these sorts of other more feminine or more domestic metaphors that she doesn't mention. She's saying that these three dominant ones that she's I identify it on privilege. Only a few parts of a very complicated job, math and engineering in particular, were viewed as sort of high-status skills. And she argues at the very end of the chapter that these sorts of high status skills had been over emphasized compared to how useful they actually were for programmers. While other skills, more sort of skills that were seen as traditionally feminine, that were also very important, are also very important. She's saying an actual programming practice. Skills like teamwork, courtesy, communication, and passion tended not to be emphasized in usual hiring criteria was, and we'll come back to it. But his conclusion at the end of the class in general, though, she's making this argument about auditing, sort of social and cultural ideas about what it took to be a good programmer, what programming skill ones? And then she's making this complex argument about the relationship of gender to those skills. And finally, I just want to sort of summarize the important points in the second text that you read today. And Nathan ends mangers texts on masculine culture within the computing professionals. So like Janet, about eight ends mangers showing us some conflicting attitudes towards computer science. Conflicting ideas about what programming skill means and especially about WHO computer scientists are. So a buck is talking mostly about skill and different ideas of what programming skill was and how those ideas were constructed. Engineer is very concerned with identity. He's very concerned with the idea of what it meant to be a programmer or what it meant to be a computing scientists. What it meant to be someone who works with computers. He wants to show us something about how this identity changed or how a particular identity develops. And in order to do that, he starts off by telling a lot of the same history that we've already discussed, a lot of the same constraint a bottle goes through. And then he focuses on, on this particular site, this particular place called the computing center. And he explains or he tries to convince the reader that these computing centers that existed within universities in the 19 seventies laid the groundwork for the development of a very particular kind of computing identity that became very dominant throughout the 19 eighties following that. But he starts by giving us contrasting points of view about these computer centers and particularly the people who worked in them, right? So he, he, he opens by coding a very negative view of these young men who worked in these computing centers, which is what the bytes and Baum quote on the left here is. So this quote describes their rumbled clothes, their unwashed and unshaded faces. They're uncommon hair, all of which testify, but they're oblivious to their bodies into the world in which they move. They exist at least one so engaged only through E14 computers. So this particular author that ends manner is quoting again, is taking a very negative viewpoint. He's looking at these people as socially isolated in a very negative sense, only interested in their machines, totally cut off from the rest of the world. Physically, gross, unhygienic, ungrouped. They spend all their time in this lab and the computing center. They don't care about anything else. People bring them food and they eat it. But there's sort of singularly obsessed with their work and with this technology and misplaced to an unhealthy degree. Contrast this with another description of the same centers and the people written by a different author, Stewart Brand. So brand also acknowledges that these people were kind of fanatics, but he sees their fanaticism as wonderful, as inspiring, as full of potential. He compares it to the fanaticism of artists or inventors or explorers he calls a magnificent. He says they're scouting a leading edge of technology, that they're brilliant, they're revolutionary, that they are serpents in the human interests. In other words, that they are sort of on the leading edge of technological development. That yes, they might be sort of obsessive, but they're obsessive because they're doing something vitally important. They are sort of pushing technological development and even human development forward. In this very important So these are two descriptions of the exact same group of people, young men who staffed computing centers I universities throughout the 19 seventies. About whom ends manner is, is, is arguing in his piece. So again, he's interested in things like the graph that I showed earlier. He's interested in explaining why gendered participation in computing has changed. And he gives us first this sort of description of a standard explanation for what's gone on here by saying, in the case of computer programming, the dominant assumption is that there are certain intellectual and emotional characteristics that are associated with computer programming ability. Logical, detached, narrowly focused, but also just happened to be more prevalent in males. So this is not what ends manor himself is arguing. He is disputing this point of view. We say this is a standard explanation for gender discrepancies within the computing professions. And he, again, like a bada, is gonna make us socially constructive arguments about what has happened here. But unlike a buddy who's focused on ideas about skill, like I said before, entering or has focused on the social construction of an NB of computer programming. But this again, is mostly repeating things that Avante has already said. He talks about sort of be early development of computer science as an academic discipline. How this was already underway by the late 19 sixties. And it involves this term towards the theoretical, excuse me, the mathematical and the abstract. Again, like about them has said as men or talks about how the academic discipline of computer science was quite masculine, but it was masculine and ways that most of academia was masculine at the time. Like I talked about Laboratories a few slides ago, as mayor is making a very particular argument, like I said, about these university computer centers of the 19 seventies. And his argument is encapsulated in this quote here. The norms, ethos, and practices are established in the university computer centers at the 19 seventies formed the basis for the emergent computer hobbyists culture of the 19 eighties and beyond and would be perpetuated and recreated in the similarly informal workspaces and playgrounds of corporate campuses. In other words, as manner is drawing a connection between these grubby university computer centers of the 19 sixties and seventies, and corporate campuses that exist at Google and Facebook and other companies like that. Today, she's seeing that there's a connection between the kind of computing identity that was formed in 19 seventies, computer centers, and a pervasive computing identity that exists today. This is what he would say. It's the important part of this piece. You saying that the culture of the 19 seventies computer centers is what led to the hackers stereotypes of the 19 eighties. And that these sort of stereotypes around hacking and personal computing of the eighties and turn birth. The societal perception of a computer genius is someone who tinkers with technologies in his garage, and he relates to the world in a certain way so What was special about these 19 seventies computer centers, how were a sort of scattered on a group of laboratories on isolated university campuses. So influential and fire argues, that there were some things about the centers that were very particular, that were very special, that led to the development of a certain kind of culture, a certain kind of idea about what computing was. Uh, who engages in computing? First of all, the centers were relatively isolated and relatively unsupervised. Which meant that the people who worked in these centers, of who's spent time there had basically unlimited access to them. And it was sort of difficult to access if you weren't part of the group that normally occupied them. Once you've began to occupy this space, once you started to work in one, you could access it almost anytime of the day or night. You had relatively sort of unfettered access to the machines that were there. You could spend as much time as he wanted. And most of the time you spent there was not supervised. So you had certain tasks that needed to be carried out, but you have a lot of other time and a lot of freedom to experiment with different things. And he also points out that most of the people who worked in and use this computer centers were relatively privileged in several ways. Their work there was mostly sheltered from sort of economic realities are serious economic consequences. Again, they were paid for certain work that they did, but they had a lot of extra time and a lot of extra resources and capacity to do other things, which gave them, again, the resources and the freedom to tinker with stuff, to play around with things, to spend their time putting enormous effort into solving relatively trivial puzzles. And he also talks about how these computer centers were, as he calls it, profoundly social and very masculine, ionized ways. He's trying to contrast the point of view that the people who work in these centers were antisocial, says they were indeed a very social. They had particular social rituals that they engaged in, but they developed a certain kind of social ritual. And these could be very masculine eyes. He briefly discusses the example of the, the image that you see on the slide here, which he didn't include him, his article, although he briefly talked about it. If any of you work in image recognition or sort of are familiar with image recognition as a field. The spinal might look familiar. It's you, it's known today with a woman in a known today mostly just lead up. She's in fact Nim. Let us sort of burg and the image that you see here is a picture of heard from the 1972 issue of Playboy magazine. So this image, that image is like it were passed around among members of these computing centers and between members of different computing centers. And became, in the case of this particular image, a standard test image that was used in image processing is the field was beginning to develop. So this photo in particular helped to create a standard that we now know as the JPEG. So very, very important and influential photo in the field of image processing was sourced from 1972 issue of Playboy magazine, which ends Megara uses as one example of ways in which social activity was masculinize within these spaces. The fact that a picture of a nude swedish model was used to sort of develop on profoundly important image processing techniques. In fact, this image is so famous and widely used and so well known that let us sort of broken herself has been a guest of honor at multiple times at image processing gatherings and I Tripoli conferences. I'm honored her for her unknowing contribution to computer science and image processing in particular. So as beggars argument is essentially that there was a very particular culture that developed in these spaces. A culture of unlimited access. So culture of being able to send all of your time, right, this, all of your free time devoted to something, a culture that valued tinkering, valued plane gains, valued sort of inventing games and practices that didn't have much practical use, but into which people withdraw a massive amount of their time and energy. But there was some sort of a masculinize, but profoundly social culture that existed in new spaces, that were ways of communicating, that were rituals, that were practices that were very unique to be spaces. He says that this matters because this 19 seventies computer center culture, although it's self was very localized, was very specific to this particular places on university campuses. He says this culture is what led to the hacker stereotypes of the 19 eighties that became much more widespread through media, through the rise of personal computing and the ways that personal computers were represented at the Times and through popular culture like TV shows and movies. He mentioned the movie War Games and the movie hackers, and the ways in which sort of bees, popular representations of Hathor stereotypes were built on this 19 seventies computing centric culture that he talks about. This sort of succession of computer center on computer bomb to 19 eighties hacker ends mayor. Arguments of this in turn give rise to the societal perceptions of a computer genius as someone who spends time in his garage tinkering with technologies at all hours of the day and night and sort of engaging in particular social rituals. As we heard some talk about this transition a lot. He sort of mentions it, but most of his evidence is centered around sort of describing the culture of the computing centers themselves. And then he sort of more briefly describes this transition into 19 eighties hacker culture or hacker stereotypes and subsequent sort of popular perceptions of what a computing professional does. He does show some sort of crystal computer advertisements from the 19 seventies and 19 eighties to try and demonstrate this, the development of this identity or the development of this stereotype. And I wanted to add a couple. The ones that he has already shown you. So as the era of personal computers began in the late 19 seventies and 19 eighties. We do see personal computers being marketed primarily towards men. Sometimes overtly gendered advertisements like the ones that you are, the one that you're seeing here, which has a more direct connection to the computer center masculine culture, that ends manner it's talking about and sometimes in less strikingly obvious ads like this one. This is in 1977 AD for the apple to personal computer, which is being used by a husband while his wife sort of looks lovingly on from the kitchen and she is preparing dinner or doing the dishes or something. So both a button and as Mayor are ultimately arguing that gendered nests or sort of gender stereotypes and the ways that we think about computing professions, computing skills and computing technologies are longstanding and worthy of our consideration. To quote from a bottom up towards the end of herpes. She writes, quote, the history of early attempts to identify skilled programmers is irrelevant to current policy debates because it challenges the notion that standards and equity are mutually exclusive. The realization that our criteria for skill may be arbitrary and biased towards masculine behaviors undermines the presumption that women simply laughed interests or ability in computing. So while her main goal in the chapter that you read is not to make a direct argument about women's participation in computing today by sort of uncovering the arbitrariness of some parts of our understanding of what programming skill is. And she means to, to dispute a kind of understood discrepancy between maintaining high standards and encouraging more diverse populations to enter computing professions. Similarly with nth Mayer's piece, he is trying to demonstrate how the development of this particular identity has biased popular perceptions of what's WHO computer programmers or computer hackers or computer scientists are. And he's trying to explain how that perception came from, as he argues, are relatively small and isolated and selected group of computing professionals. So I've just realized that I have not stopped for questions at all today and I apologize for that. I think I knew I had a lot of materials. Light was trying to race through it since I now only have the mini assignment slide. And that really comes for next week's side left. I think I'm just gonna go ahead and do those and then we can spend more time talking through questions afterwards. I apologize for not having stopped earlier. For the mini assignment for today, I want to ask you to think about what skills or what treats you think are particularly important for a successful computer scientists or computer programmer to possess. I wanna give you some freedom in defining the type of computing professional that you were talking about? I know some of you probably identify as programmers, some of you probably identified as computer scientists. Some of you may identify as software engineers. Maybe there's an intersection of those different professional life identities. So pick the computing professionalized identity that you that is important to you, or pick one that you would identify with. I don't particularly care. If you're writing about a programmer or computer scientists or whatever you want. But I want you to identify a set of skills or a set of traits that you think are important for a computing professional to possess. That's the first step. And then I want you to compare and contrast this skill set that you've described with one of the arguments that have been made by either aborted or ends manner. And the text that you read for today. So for example, does the skillset that you describe reflect one of the metaphors for programming skill is it is your ideal skill set or your sort of representative skillset on related to the idea of computer programming. Is a mathematical engine? Or is it related to a kind of business-related way of understanding programming skill? Or is it opposed to one or more of these ideas? Or maybe how do you think the skill set that you've described relates to this kind of stereotypical computer geek identity. That ends manner describes. I just want you to pick one aspect that one of the authors discussed in the readings and explain how your identified skill set for a successful computing professional relates to that idea. It can relate to it because you think it's the same word can relate to it in opposition, it's up to you to decide. So there's a lot of open-endedness, meaning assignment for this week. Basically, there are two parts. Part one lists a skillset that you think or describing a skill set that you think is important for a computing professionals to have. And then make some kind of comparison between the skillset you've described and an argument made by one of the authors for this week, right up one to two paragraphs about this and posted in the discussion forum on Moodle before class on Wednesday. So this is due anytime before 245 on Wednesday this week. I apologize again for talking for so long. I can tell I've been talking for too long as my throat is super drying out. So finally reading. Hence for next class. Next class we are going to be talking about privacy and surveillance. The assigned readings for next week are a little bit different, not Neck. Next week, Wednesday are a little bit different than usual. You only have one required texts and it's quite short, so it's not gonna take you a long time to read a journal article by Andre Twitter called Big Data Ethics. It's a relatively short read. I want you to think about this text in connection with more and Johnson's pieces on Computer Ethics. Because what Twitter is doing is essentially trying to define a particular subset of Computer Ethics that it's important when we think about big data. So we're going to have a discussion about how his theoretical arguments relate to the work on Computer Ethics and on ethics in general that we've already talked about. We are also unusually for this class. Can I talk to a particular case? On, on Wednesday, we're going to talk about the case of Facebook and Cambridge Analytica and how that relates to some of the arguments about ethics. See and surveillance that Twitter is making. So you should definitely read swears peace dot part is required. I would recommend that you read something that gives you a sense of the Facebook and Cambridge Analytica story before class. Some of you might already be very familiar with this, so you might be able to leave this part if you're not, I suggest that you read a little bit about it before class. If you have Netflix, where if you have access to a Netflix account, there's a movie that came out last year called the great hack that is available on Netflix. That goes into the story, which you're welcome to watch. I am going to Akhenaten.  
  
It's actually a lie. I've not posted it yet, but right after this class, I will post a link on Moodle to a sort of selection of journalistic pieces that explained sort of given another take on what the story was and what happens. So I would recommend that if you're not familiar with this case, that you either watch the movie or read something about it before class, but you don't have to. We're gonna talk about it during class. Be required reading is that sweater piece on Big Data Ethics. So that is all that I have for today. I again, I'm sorry for not stopping for questions earlier, but on class officially is done. Now, if you don't have questions, you can go. If you do a questions about anything that having tough now, anything in particular that you should review for the quiz next week? So like I said, it is, it's an open book quizzes, so you will have access to all of the course materials while you are writing liquid. So you don't need to worry about memorizing things. I am not finished preparing it yet, so I cannot give you specific hints about what might be particularly important. I would say that you should try to understand, make sure that you understand the arguments that are being made by the authors that we have read, which is probably about as specific as I will be able to get right now. I will on Wednesday, I'll be able to give you some more pointers about what to look at specifically. But because you will have access to all sort of the basic definitions and stuff because you'll be able to look all of that up. I would focus on trying to understand the main arguments that are made by the authors of these pieces so that you will be able to sort of easily on, you know, where to look in a text or sort of be able to easily compare and contrast things that different authors have said. Yes, yeah, so it is, it is a, I'm going to cover everything that we have done in class so far. So this is not like one week that you can fully ignore or something like that. Geoffrey is not sure you understand the main argument. Can you be a little more specific than that? Was there something in particular that was not clear? Oh, yeah.  
  
Okay. So what a bottleneck thing as compared to an entertainer. Yeah. So the authors are not, they're not arguing with each other. They don't have opposing points of view. They're writing about different states, right? They're both, they're starting at the same, but starting from the same kind of basis. They're both, they're both writing about a similar time period. They're both talking about sort of social construction of ideas around programming and computer science, uh, but his argument is about how ideas about what programming skills are, and sort of like how, what skills are important to become a successful programmer? How those became socially constructed. So these metaphors that she talks about that I have up on the slide right now. This is part of her main argument, or this is sort of a Building Blocks who remain argument. Ultimately, what she, what she's saying is that our conceptions of what skills are necessary to be a good programmer or not objective that they have been sort of socially developed in certain ways and that there are sort of gender biases and gender stereotypes that are interwoven with our ideas about what programming folate is and what it takes to be a good programmer. That's her main like high level arguments is that there's no one objective way to define programming skill. And so she has shown us ways in which programming school bus socially constructed. And she's described some of the relationships between that social construction of skill and gender bias in a kind of basic sense that that's what she's arguing in a slightly more specific sense. She's trying to outline these three main waves that you see on the slide here. Three main, kind of dominant metaphors for trying to describe what a successful programmer does. The idea that a good programmer is a logical, mathematically oriented person who can solve complex theoretical problems versus the idea. But a successful programmer is someone who can sort of manage the whole machine. You understands both hardware and software. And first is the idea of a programmer as sort of part of a business operation. You that from a kinda secretarial, clerical standpoint, or from a managerial standpoint. So she, she describes how different companies or different people or departments within a single company, you use these different ways of understanding programming skill to hire different kinds of people and to sort of seek out different kinds of workers. And by doing that sort of defines what programming jobs became. That's the gist of what she's saying. I don't know if that's clear.  
  
So she is talking about the construction of our ideas, about what it, what it takes to be a good programmer. Whereas ends mentor is talking about are the construction of our ideas of who becomes, who, who becomes a computing professional or who becomes a programmer? What, what kind of person goes into computing versus what kinds of skills are necessary to be good at computing. Cool Benjamin, who raised your hands. Go ahead. Wondering about how we could tie these two articles into the broader context of the courts or so I was having a bit of trouble. I know they would fit into kind of the ideas that were discussed at the beginning about technology and how it's inherently political with regards to their generals, and maybe a bit of ethics regarding how we navigate gendering these technologies may be or how that should be done. But I'd actually tying it more than you think you could talk about that a bit. Yeah, that's a really good question. So the first thing I will say is that some of, some of the rest of the weeks might also feel like that because the Course tends to jump around a bit between different, different topics. So some of that is to be expected both this week and in future weeks. Because part of what this course tries to do is give a little snapshot of a whole bunch of different issues and research areas. So but in terms of more particular connections than that, there certainly are axon and we can talk about some of them. So with respect to the first part of the lecture today, the stuff that was not so much directly covered in the textbook, which I tried to talk about. This is really the idea of sort of technologies association with gender is really connected to Nightingale's argument about technologies being created through a series of value latent choices. Things like technologies that have unintentional gender bias or any kind of unintentional bias associated with them. To put it in terms of Nightingale's terminology. That IS exists because of the value latent choices made by the designers of that technology who didn't realize or who I didn't maybe put enough effort into finding out that they were working with biased datasets for maybe didn't knew that that was true, but didn't have the resources to change the standards or the datasets or the set of information or the group of people that they were working with. So if Pullman Gilmore to evaluate this Oculus Rift case, he would say that the sort of the end result of a product that women tend to have more trouble using than men do because it can make them sick at a higher rate, is due to this kind of series of value laden choices that went into this particular design iterator. And it's something that current people working on VR headsets are now sort of trying to adjust as they progress through their redesign cycles. I make future design iterations. You could connect it also to Langdon Winner's argument about technologies that have political effects, right? It's something like the VR headset or something like the crash test dummy has to be political effect of sort of resulting in a technology that has some kind of inherent, not, not inherent in the way that winner uses inherent. I still I shouldn't use that word, but some kind of imbedded bias, even though that was not the intention of the person who was designing it. So in other words, to use Windows terminology There's some kind of political effect of these technologies because of the environment in which they were constructed, or perhaps because of the series of choices that went into making these particular designs, we could connect it sort of the whole, that whole first section, I think on a general level to the idea of computer ethics. I think part of designing Ethical Technology is a sort of divine designing technologies that are going to work for all the people who were supposed to be using them. So some sort of trying to design more equitable technology is, I think a part of Computer Ethics. I think we can connect the whole discussion that we just had about a bowtie and ends, mentors, texts, and sort of programming skill and computing identity in the professions. To Peter Denning's argument about what computer science as a field. He's making arguments obviously about whether or not computer science is scientific or sort of how a scientific it's been in the past, or how the field is changing. A battalion ends men are also making arguments about how a particular field or a particular profession is changing there. Talking about programming skill in about his case or but professional identity and ends manures case or gender in both cases. Rather than the sort of science versus not science angle that Peter Denning's taking. But they're still both talking about sort of what it is to be a computing professional. So I think there are connections there to be made as well. There are connections to be made between the idea of the sort of social construction of what a computing profession is. And the material that we talked about on the sort of dream, the kind of technology society relationship class about the power of technology versus the power of kind of social choice. Both of these arguments, both of these authors are making social constructivist arguments. They're just not talking about technologies in particular. They're talking about a profession instead. But there's still coming from that sort of social constructivists standpoint. So I think there are connections to be made there. I think I'll stop now, but I hope that answers your question. Yeah, that was, that was pretty good on let's see, a social constructivist standpoint. How does that stand within the other kind of, I guess, theories we've discussed in this class. Yeah.  
  
Okay, that's a complicated question. So we, when we talked about social construction of technology, that's, that's also a social constructivist standpoint right there. Just describing how groups of people or how sort of social, how sort of society's power determines the way that technologies look. Whereas the authors for today, we are talking about how sort of social, social power determines our understanding of who enters a certain field or what skills are necessary to enter that field. But it's the same approach in that they office for today are sort of giving Assigning power to the kind of people end of that spectrum. They're assigning agency to society in terms of determining what programming skill means or sort of defining computing as a field. So from a sort of basic, basic standpoint, these kinds of social constructivist approaches that we talked about today line up with the idea of social construction of technology, because they're all granting agency to society rather than attributing it to some kind of biological impulse or two, like the kind of inherent progression of technology itself. So from that point of view, I would say, yeah, those theories are in alignment. There's no, you can't really say that there's a connection or lack of connection between the text today and the idea of technological determinism, for example, just because those, these texts are just addressing a very different topic, right? They're not trying to answer a question about the power of technology directly. So it's hard to kind of line those up in the way that I think you're maybe asking about? Yeah. That was kind of in a sense I was asking about. Yeah. That makes us also and for let's see, the test. Yeah.  
  
Yeah. Until which date which reading will be asked about and test everything up until next Monday's class. So everything that comes before the tests, including Yeah, thanks. Yep. You're welcome. How did a button ends? Mayor explained the graph. Okay. So yeah, they explain the graph by let me go back to the graph slide. Yeah, so ends painter has the most direct explanation for it. I think even though he doesn't know, he doesn't have this graph in particular, he does have a graph. Let me see if I can find it in his article. He has a graph somewhere, a Google Ngram. Here we go, of the percentage of women in computer science undergraduate programs and hacker references as measured by Google, will end ground. So he, what he's trying to demonstrate here, which he's not putting this forward. It's like concrete proof in and of itself. But he's showing that around the time in the 19 eighties when women's participation in computer science degree programs peaked and then started to decline. This was the same time when this kind of popular conception of the computer hacker that he talks about was, was becoming a reality when people were starting to think about users of personal computers in a certain way. When sort of Personal computing as an, as a, as a faint when personal computers themselves are becoming more popular, were becoming possible for sort of middle-class people to buy and own. So part of the argument that he's making is that there's a connection between social stereotypes about computing and gendered participation in computing programs. As the world or as sort of Western societies come to believe that someone who was really good with computers is it's kind of geeky, well owner guy who tinkers with stuff in his parent's garage. Women seem less interested in entering this field. And even at a fixed, sort of maintained or better the kind of levels of social equality that were available to them. So this is slightly oversimplified argument and I got his whole argument is not based on this one graph. But part of what he's saying is that the way that we tend to perceive computing professions affects the people who will decide to enter those, those professions. That if we have the idea that all computer programmers are a kind of weird, lonely male geeks, then that's going to sort of push different kinds of people in or out of the fields. So I would say that that is ends manner. It's on answer to this. And in particular, he is interested in, again, this particular computer culture of these 19 seventies on-campus computer centers. And how that culture became sort of exported and amplify it through this 19 eighties hackers stereotype about, hey, I think does not address this graph directly. That's kinda purple book is kind of interested in doing that. So this chapter in particular, it doesn't come out with, this is her explanation for why this happens. But I think what she does do is try to demonstrate that there is, there's some arbitrariness in the way that we think about what it takes to be a skilled programmer, that there's some, there's a lot of leeway in the way that these jobs, certainly in the way that they were defined in the 19 sixties and seventies. And I think part of the argument that he's making is that there were dominant trends that emerged in the 19 sixties and seventies that are still MISO form apart today of the way that we think about programming skills and skills in computing professions. So she's saying that these ideas are socially constructed and it's not necessarily, there's no kind of biological determinism when it comes to representing people's skills. And there's no objectivity in defining what it takes to be a good programmer. And ultimately, she's going to argue that sort of gendered participation in computing professions, if influenced by our understandings of what skills are necessary to be successful in those professions. Does it have to do with some metaphors shift from business to mathematical. It's not a metaphor shift from business to mathematical. She's insisting that all three of these metaphors became dominant. I'll, yeah, all three of these metaphors, like how about now, became dominant in different ways. So she, she's not saying like first was one metaphor and then it moved to a different metaphor. And she's saying all three of these metaphors were presence. And all three of them sort of allowed participation from different genders in different ways. Yeah, you're welcome. Any other questions? I'm going to stop the recording.