Software Development Engineer

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General Instructions

1. For each page, synthesize the reading and research by writing in complete sentences in essay format.
   a. Use the green instructions in the notes below each page to focus your research and writing.
   b. Write about each question, prompt, or process provided in those notes.
   c. Write a full page of text with lots of detail (about 250 words).
      i. Don’t generalize so much that your writing is devoid of detail.
      ii. Don’t repeat yourself.
   d. Cite each source by adding a hyperlink in the Title of the Article or law.
   e. Do not change the template:
      i. Text must be 14 point Lato left-justified type.
      ii. Refrain from adding extra margins or double spacing.
      iii. Do not bullet the paragraphs. Write in essay format only.
   f. Add additional pages if you need more room.

2. Add all sources to the Bibliography page.
   a. Include author, year, title, publisher, and URL.
   b. Number or bullet them using the list button.

When in doubt, write to the instructor for clarification using the Canvas Inbox.
The position that I found most aligned with my interests is the **Software Development Engineer** position with the Device Analytics team on Amazon. The Device Analytics team is responsible for backend web services and mobile and Internet of Things software development kits. The team supports the whole of Amazon's device portfolio (crashes and logs) to provide predictions and insights to the future of Amazon's devices.

The software development engineer on the team is responsible for "leading the architecture, design, development and launch of some of the core product features". The engineer has a huge influence on the team's overall strategy because they define product features, drive the system architecture, and spearhead the best practices that enable a quality product.

The ideal candidate must have a track record of successfully delivering new features/products in a fast-paced environment (4+ years experience) and must be a good team player with excellent communication skills. The candidate is required to have strong technical abilities (Bachelor's degree in Computer Science or some other related field) in order to build reliable, scalable, and high performance products. The candidate should have experience with modern programming languages (Java, JavaScript, C/C++) and open-source technologies (Linux, Spring).

The job description from Amazon's website did not state anything about adherence to any code of ethics and the required qualifications were strictly technical instead.
I am writing a piece of software to place targeted advertisements on Amazon's frontend webpage. The software uses machine learning and artificial intelligence to track and analyze what users search for in their web browsers in order to place personalized ads to different users. However, I soon realize that my software is biased. If the software tracks that a user's location is at a ghetto and poor part of the community, it would show ads about community college and Alcoholics Anonymous while if the location is at a prestigious part of town, it would show ads about ivy league universities and vacation ideas. This is in violation of ACM's Code of Ethics section 1.4 Be fair and take action not to discriminate. This is because Code 1.4 says to foster fair participation and that prejudicial discrimination is a direct violation of the Code.

The first action I would take is based off of SCU's Markkula Center for Applied Ethics Making an Ethical Decision flyer. It is to recognize my problem as an ethical issue and voice it to the rest of my team and superiors so that it is known and my coworkers can work to prevent the same issue from happening in their code. The second action would be to fix my software so that the problem is solved, the artificial intelligence is unbiased, and the ads are not discriminatory against presumed background, race, or gender. According to "7 Ways to Spread the Word About a Cause You Believe In" by Mental Floss, one of the ways to spread word about a cause is to bring like-minded people together to spark a debate. My third action would be to spread the word about artificial intelligence bias to the wider computer scientist community by maybe bringing the issue up during an ACM chapter meeting or by writing a blog post about it to a technical site.
Hardware Dilemma

Since my team is also focused on Amazon's Internet of Things software development kits, I may have the opportunity to be involved in the design of the hardware of said Internet of Things product. During the design, I realize that the hardware only has a short and linear lifecycle. It is not a circular design whereby the hardware components can be reused or recycled. Based on "From a linear to a circular economy" by the government of the Netherlands, it is more important now than ever to have a circular economy so that the Earth's resources can be preserved. Products should be obtained sustainably and reuse is important. ACM's Code 1.2 Avoid harm talks about how we should minimize any harm caused. Harm is defined by ACM as negative consequences to anything including the environment. In that case, if the designed hardware is not circular, I am violating ACM's Code of Ethics.

The first action I would take is to do ample research on how to change my linear design to a circular one. I want to be knowledgeable and I will evaluate all possible alternative ways of design (Markkula Center for Applied Ethics). After that, I will conduct my second action which is to actually redesign the hardware by collaborating with the Electrical Engineers. They will bring their hardware expertise to the table whereas I will bring my software expertise. We will come up with a more sustainable hardware that also can support all the functionalities the software has to offer. Lastly, the third action is that we would come up with a low-stakes prototype and test out the design (Markkula Center for Applied Ethics). If the design is still not optimal, we would go back to action two and repeat the process until we come up with a final circular product that both parties are satisfied with.
My team and I are working to make advertisements for Amazon's website again. This time, I realized that my boss has written code to sneak a certain percentage into their own pocket from Amazon's affiliate revenue. According to "Affiliate Marketing Made Simple: A Step-by-Step Guide" by Neil Patel, affiliate marketing is when a person earns a commission based off the sales from customers they bring in through marketing or advertisements. What my boss has done is definitely not morally right because they are stealing from the company. My boss's action is not inline with ACM's Code 2.3 Know and respect existing rules pertaining to professional work. The code said to obey national rules and what my boss has done is embezzlement which is illegal.

According to "I discovered my boss was embezzling funds, what should I do?" by Chilivis Cochran Larkins Bever LLP (criminal justice attorney), the first step I should do is to collect evidence of my boss actually embezzling Amazon's affiliate earnings. Make a couple copies of the evidence in digital form so that it is harder to destroy. Next, my second step would be to discreetly hire a fraud investigator to look at the evidence and case from an objective standpoint. This is to determine if my boss is truly at fault or if I was just wrong with the numbers. A key point in this step is to do it discreetly and secretly so that if it was all just a false alarm, I would not be tarnishing the reputation of my boss and myself. Lastly, the third step would be to contact the police and hire an attorney to protect my rights as a whistleblower. I should be ready to hand all the evidence I had collected to the police. At the same time, I should not be receiving any retaliation from my company because I have rights as a whistleblower.
Access, Equity, or Infrastructure Dilemma

As a software developer engineer at Amazon, part of my job is to review and hire new software developer engineers. After being on the hiring committee for a bit, I started to realize a trend in the new hires, there is a lack of diversity. Since Amazon is such a big corporation, the first round of screening is done by an automated system. However, since the current engineers at Amazon are predominantly White males and the AI was fed data about current Amazonians, this led to the resulting algorithm to be biased towards White males. Once again, this is a violation of ACM's Code 1.4 Be fair and take action not to discriminate because the recruiting algorithm is oppressing people of their opportunity to work for Amazon because of something they are born with and cannot change.

Having biased hiring algorithms actually do occur in real life so my reaction to it will be based off of history. According to "Amazon scraps secret AI recruiting tool that showed bias against women" by Reuters, Amazon's course of action was to shut down the hiring algorithm. My first action would be to tell my higher ups about it to discuss if we should make a change to the algorithm or if we should shut it. It would be rather difficult to change the AI since the only available resume database is mostly about White males and we cannot just feed the AI random female resumes. Hence, my second action would be to shut down the AI and to not use it during the hiring process again. My third action would be to continue on with my hiring job responsibilities but this time I will be the one to take the time to review each applicant and screen them myself instead of relying on some automated process.
Amazon's most well known Internet of Things product is Alexa. Alexa is a voice controlled device that can play music, call someone, read the news, and much more. One day, I discover that my coworker has been secretly sending sensitive information recorded by Alexa from person A to person B without the consent of person A. This all seems suspicious and fishy to me because of the Electronic Communications Privacy Act (ECPA). The act exists to protect the privacy of consumers' personal information when using electronic communication such as telephones. The ECPA renders it illegal to intercept the communication of a consumer by a private entity. What my coworker has done not only violates ECPA but also violates Code 1.6 Respect privacy by ACM. The code does not allow for the collection and use of consumer's private information.

My response to this case will be similar to the dilemma on advertising, search, or news because they both revolve around federal laws. My first action would be to collect concrete digital evidence against my coworker. My second action would be to find a third-party investigator to make sure that my allegations are legitimate and valid. My last action would be to contact the police and my company because what my coworker has done is illegal by the laws of the United States of America. One thing I should absolutely not do is to confront my coworker (Chilivis Cochran Larkins Bever LLP). This is because that would tip off my coworker that I am onto them and they would get rid of all evidence. However, if I must confront them for whatever reason, I should do it in the presence of other people so that things would not get physical and so that I would not be accused of false harassment later.
Whistleblowing

Two of my dilemmas, advertising and privacy law, would require me to whistleblow. The advertising dilemma has me whistleblow about my boss's embezzlement while the privacy law dilemma has me whistleblow about my coworker's privacy invasion.

For the embezzlement case, I would probably start the whistleblowing process from ACM Enforcement Procedures and to the police as well. The ACM Enforcement Procedure is to submit a complaint regarding suspected violation of any of ACM's Code of Ethics. The caveat to this is that the subject of complaint has to be an ACM member. If my boss were not an ACM member, then I would just report their action to the local police.

For the privacy invasion case, I would take it to Electronic Communications Privacy Act (ECPA) Reporting and to the police. I could report to the ECPA because my coworker has violated their "prohibition on interception of communications" sublaw. The ECPA law states that it is illegal to wiretap or eavesdrop on electronic conversation. I would report this incident to the police because it is a federal crime.

The consequences I would face in both cases are the same, I could be retaliated against by Amazon. However, that should not be allowed because I have my rights as a whistleblower under the Whistleblower Protection Program by OSHA. If I get fired, have my pay reduced, am denied of a promotion, or get demoted, I can file a complaint to OSHA. This is because any reporting of violations that are workplace related such as environmental, financial reform, security laws, and much more are covered under the Whistleblower Protection Program.
The ethical theory I mainly focused on when making my moral decisions was The Utilitarian Approach by the Markkula Center for Applied Ethics at Santa Clara University. The definition of the theory is that it tries to increase the good done while reducing the harm done to all parties involved (community, environment, customers, employees, shareholders). It is the best balance of good over bad.

I decided to go with this approach because I figured that no matter what I decide upon, there will always be the people who benefit from it and the people who lose from it. Since that almost always is going to be the case, then why not try to find an equilibrium where the balance between gain and loss is at its maximum (maximum gain, minimum loss). The way I was thinking very much aligned with The Utilitarian Approach so that is why most of my decisions were based off that. For example, for the two cases that I had to be a whistleblower, the gains from the cases were that justice would be served and Amazon will not be dipping into illegal grounds. However, the losses were that my boss and coworker will have to face dire consequences (maybe a fine or going to prison) and I myself could be in a dangerous situation where I face retaliation.

Did the losses stop me from making the decisions that I said I would make if I were in that situation? No, it did not. Because I believe the gains overpower the losses in all the choices that I made. If the end result is a positive net, then I believe it is a good decision.
Bibliography

- “EPIC - Electronic Communications Privacy Act (ECPA).” Electronic Privacy Information Center, epic.org/privacy/ecpa/.
- “I Discovered My Boss Was Embezzling Funds, What Should I Do?” Chilivis Cochran Larkins & Bever, 27 June 2016, cclblawyers.com/i-discovered-my-boss-was-embezzling-funds-what-should-i-do/.


