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APCS Principles
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**Explore Task: Written**

**2a. Provide information on your computing innovation and computational artifact. Name the computing innovation that is represented by your computational artifact. Describe the computing innovation intended purpose and function. Describe how your computational artifact illustrates, represents or explains the computing innovation intended purpose, its function or its effect. (Approximately 100 words)**

The computing innovation depicted by my computational artifact is Amazon's Alexa. Alexa is a voice controlled digital assistant. The intended purpose of Alexa is to help the user with everyday needs such as creating a shopping list or ordering items on amazon. Alexa is also compatible with smart home electronics and can become a voice controlled command center for your home [1].My computational artifact shows these functions through the pictures of the thermostat, books, music, and the lights, all examples of things Alexa can control. The function of Alexa is displayed in the artifact in the bottom left image that is representative of the sound waves of one's voice along with the Alexa itself.

**2b. Describe your development process, explicitly identifying the computing tools and techniques you used to create your artifact. Your description must be detailed enough so that a person unfamiliar with those tools and techniques will understand your process. (Approximately 100 words)**

I made this artifact using google draw. First I went to my google drive created a new drawing. From there I began to take images from the internet and insert them into the canvas by dragging and dropping them. I then created a text box for the title of the artifact. From there, I resized the images by clicking them once and dragging the blue square to make the image the desired size. From there I clicked and dragged the images to where I wished them to be placed. To make one behind another, I right clicked the image and clicked "send to back." Then when the drawing was as desired, I saved as a PDF.

**2c. Explain at least one beneficial effect and at least one harmful effect the computing innovation has had, or has the potential to have, on society, economy, or culture. (Approximately 250 words)**

A beneficial effect Alexa has on society is its potential to help people save energy. Alexa can control almost all smart features of a house, including lights and thermostat [3]. The ease of telling Alexa to "turn off all the lights," or "turn the thermostat down to 65," makes saving energy easier. Alexa's home control ability can save users money with a smaller energy bill or

gas bill as well as reducing the use of fossil fuels by not using as much energy in total. Amazon's Alexa can have a major beneficial impact on the user's wallets and the environment. Alexa does have the potential to have a drastic negative effect on society as well. Alexa, like any website, collects information about how users interact with it. Everything a user says to Alexa is recorded and stored in Amazon's cloud. Alexa can be used to make purchases, check bank accounts, and even message people. All of this information is accessible to Amazon, even though banking information is often encrypted. [4]. All of one's data being stored on the cloud poses a large hazard of information being leaked or stolen. This is one of the main concerns of those who use Alexa. If someone can steal information from an Alexa, the possible outcome could be devastating to the user. Alexa's negative effect is the possibility of a user's information being stolen.

**2d . Using specific details, describe: The data your innovation uses. How the innovation consumes (as input), produces (as output), and/or transforms data. At least one data storage concern, data privacy concern, or data security concern directly related to the computing innovation. (Approximately 250 words)**

Alexa has several microphones build into the device. When not in use, Alexa is always listening for the wake word. When Alexa hears it, the microphones record everything you say after the wake word. This inputted audio will then be sent to Amazon over the internet to be processed. The service "Alexa Voice Services" transforms the recording into commands and interprets it. After the data is turned into a command, it is then performed by the Alexa in the home. The command computed by the Alexa is the output [2]. Alexa has many people concerned over data privacy and security. Many are worried about data privacy, as Amazon has access to information spoken to Alexa. It is all sent as recording to Amazon's program and saved [4]. Another data concern is with security. All of Alexa's information is cloud based. Cloud based information is more vulnerable to information being stolen. And since banking information and personal information are a large function of Amazon Alexa, security concerns are not to be taken lightly. Having microphones always listening is a huge concern for consumers. The microphones could be tapped and record user's conversations without their knowing. There any many possible security and privacy concerns with Amazon's Alexa.

**2e. For each online source, include the permanent URL. Identify the author, title, source, the date you retrieved the source, and, if possible, the date the reference was written or posted. For each print source, include the author, title of excerpt/article and magazine or book, page number(s), publisher, and date of publication.**

[1]"Alexa Features @ Amazon.com." *Amazon*, Amazon, 2018, www.amazon.com/b/ref=aeg_lp_features/ref=s9_acss_bw_cg_aeglp_md1_w?node=17934672011&pf_rd_m=ATVPDKIKX0DER&pf_rd_s=merchandised-search-4&pf_rd_r=FJ8JPHYWJVPT

WKMECXMF&pf_rd_t=101&pf_rd_p=f340afdd-f9e2-4001-b642-b6cb588880a9&pf_rd_i=17934671011.
[2]Baguley, Richard. “Appliance Science: Alexa, How Does Alexa Work?” *CNET*, CNET, 4 Aug. 2016, www.cnet.com/news/appliance-science-alexa-how-does-alexa-work-the-science-of-amazons-echo/.

[3]Clauser, Grant. “What Is Alexa? What Is Amazon Echo, and Should You Get One?” *Wirecutter: Reviews for the Real World*, Wirecutter, 21 Nov. 2018, thewirecutter.com/reviews/what-is-alexa-what-is-the-amazon-echo-and-should-you-get-one/

[4]Shulevitz, Judith. “Alexa, Should We Trust You?” *The Atlantic*, Atlantic Media Company, 7 Nov. 2018, www.theatlantic.com/magazine/archive/2018/11/alexa-how-will-you-change-us/570844/.