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's intended purpose and function.**
- **Describe how your computational artifact illustrates, represents, or explains the computing innovation's intended purpose, its function, or its effect.**

(Must not exceed 100 words)

The computing innovation represented by my artifact is virtual reality. The purpose of virtual reality is "to help humans better understand spaces and places in context" (3). The computational artifact illustrates the purpose by showing images of people exploring places and concepts through the visuals displayed by virtual reality. Both the top-left picture and bottom-right picture show people exploring nature, the bottom-left picture shows someone exploring outer space, and the top-right picture shows someone exploring human anatomy.

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.
(Must not exceed 100 words)

I used Gimp to create my artifact. I collected four images online that represented my computational artifact's purpose and compiled them to make the artifact. I used the scale tool to resize each image to be exactly one-fourth of the canvas size. Then, I used the move tool to move each image to the center of one-fourth of the canvas. After that, I used the rectangle select tool to select and remove the center of the image. Then, I added in the center an image of a virtual reality headset. Lastly, I added "Virtual Reality" at the top of the image, making "Virtual" a white colored text and "Reality" a black colored text.

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.
(Must not exceed 250 words)

One beneficial effect the computing innovation has had on society is helping people overcome their phobias. From virtual reality's visual imagery, doctors have been able to use it as exposure therapy for a woman with a fear of spiders, exposing her to a video of a spider six times (1). However, virtual reality does have its disadvantages. One harmful effect the computing innovation has had on society is that it can provide people with visual problems and headaches. According to the article, "7 Surprising Side Effects of Virtual Reality," by Jess Bolluyt, "one of the biggest problems is that a phenomenon called vergence-accommodation conflict can cause eyestrain. (As Wired's Sarah Zhang explains, this is an eye-focusing problem that arises because VR headsets create 3D images by showing your left and right eyes images that are slightly offset)" (4).

2d. Using specific details, describe:

- **the data your innovation uses;**
- **how the innovation consumes (as input), produces (as output), and/or transforms data; and**
- **at least one data storage concern, data privacy concern, or data security concern directly related to the computing innovation.**

(Must not exceed 250 words)

Virtual reality uses sensor data, motion data, and picture/video data to display virtual imagery. The user inputs what image/video they want to see through VR. The VR then receives this data and displays to them their desired image/video. According to "What is Virtual Reality (VR) and How Does It Work?" "Eye tracking is another important feature being incorporated into newer VR headset models, with infrared scanners tracking where the user's eyes are looking" (2). Through its sensors, virtual reality detects the movement of the user's eyes and adjusts the picture as well as the focus. VR also uses motion data to detect the movement of the user and adjusts the picture based on this data. One data privacy concern comes from virtual reality's ability to record. According to "Virtual Reality: Real Privacy and Security Risks," one risk "is the hacking of recordings and other private information while the products are in use" (5). Hackers have the ability to hack into a user's virtual reality and record them without their knowledge.

References

2e. Provide a list of at least three online or print sources used to create your computational artifact and/or support your responses to the prompts provided in this performance task.

- **At least two of the sources must have been created after the end of the previous academic year.**
- **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.**
- **If you include an interview source, include the name of the person you interviewed, the date on which the interview occurred, and the person's position in the field.**
- **Include citations for the sources you used, and number each source accordingly.**
- **Each source must be relevant, credible, and easily accessed.**

1. Waltz, Emily. "VR Therapy Makes Arachnophobes Braver Around Real Spiders." *IEEE Spectrum: Technology, Engineering, and Science News*, IEEE Spectrum, 24 Jan. 2019, http://spectrum.ieee.org/the-human-os/biomedical/devices/spider-video-therapy. Accessed 30 January 2019
2. Pavlovic, Dwight. "What Is Virtual Reality (VR) and How Does It Work?" *HP Store UK*, HP, 3 July 2018, https://store.hp.com/app/tech-takes/what-is-virtual-reality-how-does-it-work. Accessed 30 January 2019
3. Lomas, Natasha. "What's the Point of Virtual Reality?" *TechCrunch*, TechCrunch, 26 May 2016, https://techcrunch.com/2016/05/26/whats-the-point-of-virtual-reality/. Accessed 30 January 2019
4. Bolluyt, Jess. "7 Surprising Side Effects of Virtual Reality." *The Cheat Sheet*, The Cheat Sheet, 25 Jan. 2017, https://www.cheatsheet.com/gear-style/surprising-side-effects-of-virtual-reality.html/. Accessed 4 February 2019
5. McGee, Marianne Kolbasuk. "Virtual Reality: Real Privacy and Security Risks." *Data Breach Today*, 16 June 2016, https://www.databreachtoday.com/interviews/virtual-reality-real-privacy-security-risks-i-3221. Accessed 5 February 2019