
AP[®] Computer Science Principles

Sample Student Responses and Scoring Commentary

Inside:

Performance Task—Explore

- Scoring Guideline**
- Scoring Commentary**

Student Samples provided separately

AP[®] COMPUTER SCIENCE PRINCIPLES — EXPLORE PERFORMANCE TASK

2019 SCORING GUIDELINES

Reporting Category	Task	Scoring Criteria	Decision Rules	Scoring Notes
Row 1 Using Development Processes and Tools	COMP. ARTIFACT	<p>The computational artifact:</p> <ul style="list-style-type: none"> Identifies the computing innovation. <p style="text-align: center;">AND</p> <ul style="list-style-type: none"> Provides an illustration, representation, or explanation of the computing innovation’s intended purpose, function, or effect. 	<p>The written response can be used to aid the understanding of how the computational artifact illustrates, represents, or explains the computing innovation’s intended purpose, function, or effect.</p> <p>Do NOT award a point if any one of the following is true:</p> <ul style="list-style-type: none"> there is no artifact; or the artifact is not a computational artifact; or the innovation identified in the artifact does not match the innovation described in the written response; or the artifact does not identify the innovation clearly; or the artifact does not illustrate, represent or explain the innovation’s intended purpose, function, or effect; or the artifact illustrates a feature of the innovation instead of the purpose, function, or effect; or the computational artifact doesn’t clearly illustrate, represent, or explain as required in the scoring criteria AND the written response describes the innovation’s intended purpose and function without explaining how the computational artifact illustrates, represents, or explains the intended purpose, function, or effect. 	<ul style="list-style-type: none"> A computational artifact is something created by a human using a computer and can be, but is not limited to, a program, an image, an audio, a video, a presentation, or a web page file. The computational artifact could solve a problem, show creative expression, or provide a viewer with new insight or knowledge. A computing innovation is an innovation that includes a computer or program code as an integral part of its functionality.
Row 2 Analyzing Impact of Computing	RESPONSE 2A	<ul style="list-style-type: none"> States a fact about the correctly identified computing innovation’s intended purpose OR function. 	<p>Do NOT award a point if:</p> <ul style="list-style-type: none"> the identified innovation is not a computing innovation; or the written statement gives an effect (which is required for the scoring criteria in Row 3, not Row 2). 	<ul style="list-style-type: none"> A computing innovation is an innovation that includes a computer or program code as an integral part of its functionality. Computing innovations may be physical computing innovations such as Google glasses or self-driving cars, non-physical computer software like a cell phone app, or computing concepts such as e-commerce or social networking which rely on physical transactions conducted on the Internet. Purpose means the intended goal or objective of the innovation. Function means how the innovation works (e.g., consumes and produces data).
Row 3 Analyzing Impact of Computing	RESPONSE 2C	<ul style="list-style-type: none"> Identifies at least ONE effect of the identified or described computing innovation. 	<p>The effect does not need to be specifically identified as beneficial or harmful. The effect must be identified, but it doesn’t have to be described to earn the point.</p> <p>Do NOT award a point if any one of the following is true:</p> <ul style="list-style-type: none"> the described innovation is not a computing innovation; or the identified effect is actually a purpose for using the computing innovation (e.g., allows me to make videos to share with my family); or the identified effect is actually a function or use of the computing innovation (e.g., self-driving cars can drive me to work); or the identified effect is not a result of the use of the innovation as intended (e.g., a self-driving car is not intended to crash, therefore, its exposure to hacking is not an effect of its intended use). 	<ul style="list-style-type: none"> An effect may be an impact, result, outcome, etc.

AP[®] COMPUTER SCIENCE PRINCIPLES — EXPLORE PERFORMANCE TASK

2019 SCORING GUIDELINES

Reporting Category	Task	Scoring Criteria	Decision Rules	Scoring Notes
Row 4 Analyzing Impact of Computing	RESPONSE 2C	<ul style="list-style-type: none"> • Identifies a beneficial effect of the identified or described computing innovation. <p style="text-align: center;">AND</p> <ul style="list-style-type: none"> • Identifies a harmful effect of the identified or described computing innovation. 	<p>Responses that earn this point will also earn the point for Row 3.</p> <p>Responses should be evaluated on the rationale provided in the response not on the interpretation or inference on the part of the scorer.</p> <p>Do NOT award a point if any one of the following is true:</p> <ul style="list-style-type: none"> • the described innovation is not a computing innovation; or • the response is missing the adjectives harmful or beneficial (or synonyms thereof); or • the response is missing a plausible beneficial effect; or • the response is missing a plausible harmful effect; or • the identified effect is actually a purpose for using the computing innovation (e.g., allows me to make videos to share with my family); or • the identified effect is actually a function or use of the computing innovation (e.g., self-driving cars can drive me to work); or • the identified effect is not a result of the use of the innovation as intended (e.g., a self-driving car is not intended to crash, therefore, its exposure to hacking is not an effect of its intended use). 	<ul style="list-style-type: none"> • An effect may be an impact, result, outcome, etc. • Beneficial and/or harmful effects are contextual and interpretive; identification includes both the classification of the effect as beneficial or harmful and justification for that classification.
Row 5 Analyzing Impact of Computing	RESPONSE 2C	<ul style="list-style-type: none"> • Explains how ONE of the identified effects relates to society, economy, or culture. 	<p>Responses that earn the point for this row must have earned the point for Row 3.</p> <p>Responses should be evaluated on the rationale provided in the response not on the interpretation or inference on the part of the scorer.</p> <p>Do NOT award a point if any one of the following is true:</p> <ul style="list-style-type: none"> • the described innovation is not a computing innovation; or • the explanation does not connect one of the effects to society, economy, or culture. 	<ul style="list-style-type: none"> • Effects need to be related to society, economy, or culture. Groups or individuals can be used to represent society. Examples of effects include but are not limited to: <ul style="list-style-type: none"> ○ The innovation and impact of social media online access varies in different countries and in different socioeconomic groups. (EK 7.4.1A) ○ Mobile, wireless, and networked computing have an impact on innovation throughout the world. (EK 7.4.1B) ○ The global distribution of computing resources raises issues of equity, access and power. (EK 7.4.1C) ○ Groups and individuals are affected by the “digital divide.” (EK 7.4.1D) ○ Networks and infrastructure are supported by both commercial and governmental initiatives. (EK 7.4.1E)

AP[®] COMPUTER SCIENCE PRINCIPLES — EXPLORE PERFORMANCE TASK

2019 SCORING GUIDELINES

Reporting Category	Task	Scoring Criteria	Decision Rules	Scoring Notes
Row 6 Analyzing Data and Information	RESPONSE 2D	<ul style="list-style-type: none"> • Identifies the data that the identified or described computing innovation uses. <p style="text-align: center;">AND</p> <ul style="list-style-type: none"> • Explains how that data is consumed, produced, OR transformed. 	<p>Responses should be evaluated on the rationale provided in the response not on the interpretation or inference on the part of the scorer.</p> <p>Do NOT award a point if any one of the following is true:</p> <ul style="list-style-type: none"> • the described innovation is not a computing innovation; or • the response does not state the specific name of the data or simply says “data”; or • the response confuses or conflates the innovation with the data: response fails to explain what happens to the data; or • the response confuses the source of the data with the data. 	<ul style="list-style-type: none"> • Data types include: integers, numbers, Booleans, text, image, video, audio, signals. Data that infer these types like fingerprints, temperature, music, length, pictures, etc. are allowed. • Data collection devices (e.g., sensors, cameras, etc.) are not data. • Large data sets include data such as transactions, measurements, texts, sounds, images, and videos. (EK 3.2.2A)
Row 7 Analyzing Data and Information	RESPONSE 2D	<ul style="list-style-type: none"> • Identify one data storage, data privacy, OR data security concern related to the identified or described computing innovation. 	<p>Responses should be evaluated on the rationale provided in the response not on the interpretation or inference on the part of the scorer.</p> <p>Responses can earn this point even if they refer to the data in a general without specifically identifying the data being used.</p> <p>Do NOT award a point if any one of the following is true:</p> <ul style="list-style-type: none"> • the described innovation is not a computing innovation; or • the response identifies or describes a concern that is not related to data. 	
Row 8 Finding and Evaluating Information	RESPONSE 2E & ARTIFACT / WRITTEN RESPONSE	<ul style="list-style-type: none"> • References, through in-text citation, at least 3 different sources. 	<p>The in-text citations can appear in any text included in the artifact or the written response. The in-text citations may be oral in the computational artifact.</p> <p>Do NOT award a point if any one of the following is true:</p> <ul style="list-style-type: none"> • the response contains a list of sources only, no in-text citations; or • the response contains less than three in-text citations; or • there are not three in-text citations with corresponding references. 	<ul style="list-style-type: none"> • In-text citations may be provided in any way that acknowledges the source: <ul style="list-style-type: none"> ○ According to...” or “As written in the New York Times...” ○ Parenthetical ○ Footnotes ○ Numerical superscripts with corresponding footnote ○ Number system with a corresponding reference

AP[®] COMPUTER SCIENCE PRINCIPLES

2019 SCORING COMMENTARY

Explore Performance Task

Note: Student samples are quoted verbatim and may contain spelling and grammatical errors.

Overview

Computing innovations impact our lives in ways that require considerable study and reflection for us to fully understand them. In this performance task, students explored a computing innovation of their choice. The close examination of this computing innovation deepens the students' understanding of computer science principles.

Sample: A

Row 1: 1

Row 2: 1

Row 3: 1

Row 4: 1

Row 5: 1

Row 6: 1

Row 7: 1

Row 8: 1

Row 1:

The response earned the point for this row.

The computing innovation is identified as Facial Recognition Software. The computational artifact uses an image of Facial Recognition Software and an arrow to point to the metrics that are being captured by the computing innovation to demonstrate its function.

Row 2:

The response earned the point for this row.

The response states a function about the correctly identified computing innovation: "functions by detecting a face in an image or video that is matched with known faces in a database for identification."

Row 3:

The response earned the point for this row.

The response states a beneficial effect: "lower crime rate."

Row 4:

The response earned the point for this row.

The response identifies a beneficial effect as lowering the crime rate.

The response identifies a harmful effect as "misidentification can lead to extreme consequences as this device is used by law enforcement and could incriminate the wrong person."

Row 5:

The response earned the point for this row.

The response explains how the harmful effect relates to the society: "its misidentifying tendencies, more often misidentifying people of color."

AP[®] COMPUTER SCIENCE PRINCIPLES

2019 SCORING COMMENTARY

Explore Performance Task (continued)

Row 6:

The response earned the point for this row.

The response cites the data as "pictures and videos through cameras capturing their images."

The response explains that data is "transformed into a format that allows all images to have the same resolution, focus, brightness, etc."

Row 7:

The response earned the point for this row.

The response states a privacy concern: "One data privacy concern is that humans will be tracked by simply going out in public."

Row 8:

The response earned the point for this row.

At least three in-text attributed citations are being used and a corresponding bibliography is included.

Sample: B**Row 1: 1****Row 2: 1****Row 3: 1****Row 4: 1****Row 5: 1****Row 6: 1****Row 7: 1****Row 8: 1****Row 1:**

The response earned the point for this row.

The computing innovation identified are 3D Printers. The artifact illustrates the process of how they function.

Row 2:

The response earned the point for this row.

The response states a fact about the purpose of the computing innovation: "3D printing allows its users to create their desired object by using their choice of material in a quick and efficient way."

Row 3:

The response earned the point for this row.

The response states that a beneficial effect is to "produce products in new ways while also reducing material waste, saving energy, and shortening the time needed to bring products to the market."

AP[®] COMPUTER SCIENCE PRINCIPLES

2019 SCORING COMMENTARY

Explore Performance Task (continued)

Row 4:

The response earned the point for this row.

The response states that a benefit is to "produce products in new ways while also reducing material waste, saving energy, and shortening the time needed to bring products to the market."

The response states a harmful effect as the excess plastic can create "landfills filled with plastic which will ultimately negatively affect the environment."

Row 5:

The response earned the point for this row.

The response does identify that "landfills filled with plastic which will ultimately negatively affect the environment" as an impact on society."

Row 6:

The response earned the point for this row.

The response identifies that "3D Printers contain G-code files, which is a widely used numerical control programming language that instructs the printer how to build the product layer by layer."

Row 7:

The response earned the point for this row.

The response does identify that these files "lack encryption or integrity checking capabilities. This means that an attacker could easily gain access to your G-code and modify your files without you even knowing."

Row 8:

The response earned the point for this row.

At least three inline attributed citations are used with corresponding resources.

Sample: C**Row 1: 1****Row 2: 1****Row 3: 1****Row 4: 1****Row 5: 1****Row 6: 1****Row 7: 1****Row 8: 0****Row 1:**

The response earned the point for this row.

The computing innovation is identified as YouTube. The graphic shows "how creators make a video and that video goes to the viewer in a form of **entertainment**, then the viewer encounters ads throughout the video therefore giving a cycle of revenue from the creators and to YouTube themselves."

AP[®] COMPUTER SCIENCE PRINCIPLES

2019 SCORING COMMENTARY

Explore Performance Task (continued)

Row 2:

The response earned the point for this row.

The response states a fact about the purpose of the computing innovation: "YouTube is able to function because creators called Youtubers upload videos to the site for views to watch."

Row 3:

The response earned the point for this row.

The response states a beneficial effect the computing innovation has on the economy: "YouTube has its own economic cycle which gives full-time jobs to some creators."

Row 4:

The response earned the point for this row.

The response states a beneficial effect the computing innovation has on the economy: "YouTube has its own economic cycle which gives full-time jobs to some creators."

The response identifies a harmful effect as "YouTube can be used as a way to spread negative or false ideas through videos and popular Youtubers."

Row 5:

The response earned the point for this row.

The response explains a harmful effect to society as "the effect these Youtubers can have on children. Many children idolize Youtubers they watch daily and most want to be like them in some way. This can mean that if the particular Youtuber has negative views like racism, or act in a harmful way; like destruction of property then the children might be prone to act like them and have a harmful effect on society."

Row 6:

The response earned the point for this row.

The response cites the data as recorded videos: "YouTubes uses a lossy compression type for the videos so it can meet the needs of the viewer ... if the viewer has slow internet then they can turn down the resolution and the video will load faster."

Row 7:

The response earned the point for this row.

The response states a security issue: "someone could hack into a Youtubers account and either pretend to be them, upload harmful videos, or delete the channel completely."

Row 8:

The response did not earn a point for this row.

While there are several references, there are no in-text citations.

AP[®] COMPUTER SCIENCE PRINCIPLES

2019 SCORING COMMENTARY

Explore Performance Task (continued)

Sample: D

Row 1: 1

Row 2: 1

Row 3: 1

Row 4: 1

Row 5: 1

Row 6: 0

Row 7: 1

Row 8: 1

Row 1:

The response earned the point for this row.

The computing innovation is identified as chatbots. The computational artifact uses an image of a phone with a person texting a robot to convey that the function of Eve of Evie is that of a chatbot.

Row 2:

The response earned the point for this row.

The response states a fact about the purpose of the computing innovation: "to send out messages and alerts to clients and respond to simple questions and inquiries that may have for the company."

Row 3:

The response earned the point for this row.

The response states a beneficial effect: "save money and time for companies when they are used in customer service and to keep consumers informed."

Row 4:

The response earned the point for this row.

The response identifies a beneficial effect as "save money and time for companies when they are used in customer service and to keep consumers informed."

The response identifies a harmful effect: "they don't always answer questions correctly and they have a hard time answering complex questions. This can frustrate consumers. Frustrated consumers are less likely to buy products and will stimulate the economy less."

Row 5:

The response earned the point for this row.

The response explains a beneficial effect to society: "This benefits the economy by making it more efficient for both consumers and companies alike allowing them to spend resources elsewhere."

Row 6:

The response did not earn a point for this row.

The response does not identify the data that the identified computing innovation uses, only where the data is coming from (given to them by the company).

Row 7:

The response earned the point for this row.

The response states a privacy issue. That chatbots could "use private information given to them in conversation to send a consumer advertisements directly targeted toward them."

AP[®] COMPUTER SCIENCE PRINCIPLES

2019 SCORING COMMENTARY

Explore Performance Task (continued)

Row 8:

The response earned the point for this row.

At least three in-text attributed citations are being used, and a corresponding bibliography is included.

Sample: E**Row 1: 1****Row 2: 1****Row 3: 1****Row 4: 1****Row 5: 0****Row 6: 0****Row 7: 1****Row 8: 1****Row 1:**

The response earned the point for this row.

The computing innovation is identified as machine learning for cyber security. The computational artifact shows the computing innovation's function by using an image of machine learning and arrows demonstrating how machine learning is used in the context of cyber security.

Row 2:

The response earned the point for this row.

The response states a fact about the purpose of the computing innovation, which is "to use machine learning to assist existing systems."

Row 3:

The response earned the point for this row.

The response states an effect: "the increased security will also encourage people behind cyber attacks to create stronger attacks."

Row 4:

The response earned the point for this row.

The response identifies a beneficial effect: "companies will save a lot of time when finding cyber security threats."

The response identifies a harmful effect: "the increased security will also encourage people behind cyber attacks to create stronger attacks."

Row 5:

The response did not earn a point for this row.

The response does not explain how the harmful effect is related to society, economy, or culture.

Row 6:

The response did not earn a point for this row.

It is unclear whether the data that has been identified is connected to a computing innovation.

AP[®] COMPUTER SCIENCE PRINCIPLES

2019 SCORING COMMENTARY

Explore Performance Task (continued)

Row 7:

The response earned the point for this row.

The response states a security concern: "cyber attackers may start using machine learning algorithms to study what the security algorithms say is acceptable files."

Row 8:

The response earned the point for this row.

At least three in-text attributed citations are being used, and a corresponding bibliography is included.

Sample: F**Row 1: 1****Row 2: 1****Row 3: 1****Row 4: 1****Row 5: 0****Row 6: 1****Row 7: 1****Row 8: 0****Row 1:**

The response earned the point for this row.

The computing innovation identified is virtual reality. Graphics are used to show that virtual reality allows a person to see things that aren't in the physical world. It goes on to address how virtual reality functions through the bullets on the computational artifacts.

Row 2:

The response earned the point for this row.

The response states that "[t]he intended purpose of the innovation is to place a user in an realistic and authentic location."

Row 3:

The response earned the point for this row.

The response states that "[a] benefit that this system has is the ability to train new employees the skills they need for the job."

Row 4:

The response earned the point for this row.

The response states a beneficial effect: "the ability to train new employees the skills they need for the job."

The response states a harmful effect: "VR can also have a harmful effect on your health. The VR can cause dizziness and nausea if left on too long."

Row 5:

The response did not earn the point for this row.

The response does not specifically identify an effect on society, economy, or culture.

AP[®] COMPUTER SCIENCE PRINCIPLES

2019 SCORING COMMENTARY

Explore Performance Task (continued)

Row 6:

The response earned the point for this row.

The response does identify the specific data being transformed: image, eye tracking data, and motion tracking data, etc. "The data is consumed from the console or computer onto device using HDMI cable. The device can also have a built in slot for a mobile phone."

Row 7:

The response earned the point for this row.

The response identifies a privacy concern: "a big one is how the companies collect your location-based information. This means that the companies collect where in the world you are and what time zone you're in. This would be concerning, because they could locate exactly where you are and how to get to you."

Row 8:

The response did not earn the point for this row.

There are no inline citations.

Sample: G**Row 1: 1****Row 2: 1****Row 3: 1****Row 4: 0****Row 5: 1****Row 6: 0****Row 7: 0****Row 8: 1****Row 1:**

The response earned the point for this row.

The computing innovation is identified as Snapchat. The computational artifact uses an image of Snapchat that identifies the purpose as "a way of sending videos and picture to people it is a messaging application."

Row 2:

The response earned the point for this row.

The response states a fact about the purpose of the computing innovation: "allows you to send video and pictures that disappear after being viewed."

Row 3:

The response earned the point for this row.

The response states a harmful effect: "the snapchat streaks because teens invest so much time in their streak."

Row 4:

The response did not earn a point for this row.

The response identifies a harmful effect as "teens invest so much time in their streak."

The response states that "[o]ne beneficial effect about snapchat has more than 173 million daily active users." However, that is not an effect.

AP[®] COMPUTER SCIENCE PRINCIPLES 2019 SCORING COMMENTARY

Explore Performance Task (continued)

Row 5:

The response earned the point for this row.

The identified harmful effect of Snapchat streaks, that "teens invest so much time in their streak," uses teens to represent a society group.

Row 6:

The response did not earn a point for this row.

The response does not explain how any specific data is consumed, produced, or transformed.

Row 7:

The response did not earn a point for this row.

The response does not identify what the privacy concern actually is.

Row 8:

The response earned the point for this row.

At least three inline attributed citations are used with corresponding resources.

Sample: H

Row 1: 1

Row 2: 1

Row 3: 0

Row 4: 0

Row 5: 0

Row 6: 1

Row 7: 1

Row 8: 0

Row 1:

The response earned the point for this row.

The computing innovation identified is BIGtoken. The written response indicates that the intended purpose of the innovation is to "take feedback of your response to the surveys that you have taken and sell it to other companies and give you a portion of the money."

Row 2:

The response earned the point for this row.

The response does state a fact about the function of the computing innovation: "answering the survey and gain as many points as you can to redeem it for money by PayPal."

Row 3:

The response did not earn the point for this row.

The response states the purpose of the innovation: "it gives people money for doing simple surveys." However, the stated purpose is not considered an effect of the innovation.

AP[®] COMPUTER SCIENCE PRINCIPLES

2019 SCORING COMMENTARY

Explore Performance Task (continued)

Row 4:

The response did not earn the point for this row.

The response does not state a beneficial effect. The response states the purpose of the innovation.

The response does not state a harmful effect. Not answering the survey truthfully is not using the intended purpose of the innovation.

Row 5:

The response did not earn the point for this row.

The response identifies that "it would affect the economy because businesses will stop paying users" as the result of the innovation not being used for its intended purpose.

Row 6:

The response earned the point for this row.

The response does identify the specific data being used by the innovation: "name, age, location." In response 2a, the response then explains how the data is consumed: "to take feedback of your response to the surveys that you have taken and sell it to other companies."

Row 7:

The response earned the point for this row.

The response identifies a data privacy concern as "giving your information to different companies and that can result in peoples privacy being interrupted by many ads."

Row 8:

The response did not earn the point for this row.

There are no inline citations.

Sample: I**Row 1: 0****Row 2: 1****Row 3: 1****Row 4: 0****Row 5: 1****Row 6: 0****Row 7: 0****Row 8: 0****Row 1:**

The response did not earn the point for this row.

There is no artifact that illustrates the innovation's intended purpose, function, or effect.

Row 2:

The response earned the point for this row.

The response does state a fact about the purpose of the computing innovation: "The purpose of the smartwatch is to be a wearable computing device with close resemblance to a wristwatch."

AP[®] COMPUTER SCIENCE PRINCIPLES

2019 SCORING COMMENTARY

Explore Performance Task (continued)

Row 3:

The response earned the point for this row.

The response states that "the computing innovation- smart watch- has on society is people is quick access to notifications."

Row 4:

The response did not earn the point for this row.

The response states that "[o]ne beneficial effect of the computing innovation- smart watch- has on society is people is quick access to notifications."

However, the response does not identify a harmful effect. To "receive inaccurate data when referring to the detection of your exercise and fitness" would be a limitation or malfunction of the innovation.

Row 5:

The response earned the point for this row.

The response does identify a beneficial effect on society: "the computing innovation- smart watch- has on society is people is quick access to notifications."

Row 6:

The response did not earn the point for this row.

The response does identify the specific data being transformed. However, the type is not specified.

Row 7:

The response did not earn the point for this row.

The response does not identify a data storage, privacy, or security concern.

Row 8:

The response did not earn the point for this row.

There are no inline citations.

Sample: J**Row 1: 1****Row 2: 1****Row 3: 0****Row 4: 0****Row 5: 0****Row 6: 0****Row 7: 0****Row 8: 0****Row 1:**

The response earned the point for this row.

The computing innovation is identified in the written response as the Intel Core i9-9980XE Extreme Edition processor. The computational artifact "shows the processor, and a bit of binary code" that is "used as instructions that is read by a processor."

AP[®] COMPUTER SCIENCE PRINCIPLES

2019 SCORING COMMENTARY

Explore Performance Task (continued)

Row 2:

The response earned the point for this row.

The response states that "[t]he purpose of a processor is too read instructions given by a computing program."

Row 3:

The response did not earn the point for this row.

The response does not state an effect of the computing innovation. It only identifies facts (next step and number of cores) and limitations (price) of the innovation.

Row 4:

The response did not earn the point for this row.

The response does not identify a beneficial effect of the computing innovation. That it is "the next level of gaming and other functions of computers" and has "18 cores" are facts about the innovation and not effects. The response does not identify a harmful effect. That "not everyone can get their hands on this latest technology because of the price" is a barrier to obtaining the innovation and not a direct effect of it.

Row 5:

The response did not earn the point for this row.

The response does not explain how the innovation relates to society, economy, or culture. No effects are identified.

Row 6:

The response did not earn the point for this row.

The response does not identify data used by the innovation. It states that it "will access data and memory from the RAM" but does not describe what specific data is being used. The reference to "reads the instructions (in binary)" does not identify the data because binary numbers make up data and are not a specific type of data.

Row 7:

The response did not earn a point for this row.

The response does not identify any data storage, privacy, or security concern.

Row 8:

The response did not earn a point for this row.

The response does not have any inline citations to support the references.