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# AP Computer Science Principles

## Sample Student Responses and Scoring Commentary

### **Inside:**

#### **Performance Task — Explore**

- Scoring Guideline**
- Scoring Commentary**

**Student Samples provided separately**

# AP<sup>®</sup> Computer Science Principles — Explore Performance Task: 2018 Scoring Guidelines and Notes

Reporting Category	Task	Scoring Criteria	Decision Rules	Scoring Notes
Row 1  Using Development Processes and Tools	<b>COMP. ARTIFACT</b>	The computational artifact: <ul style="list-style-type: none"> <li>• Identifies the computing innovation.</li> <li style="text-align: center;"><b>AND</b></li> <li>• Provides an illustration, representation, or explanation of the computing innovation’s intended purpose, function, or effect.</li> </ul>	The written response can be used to aid the understanding of <b>how</b> the computational artifact illustrates, represents, or explains the computing innovation’s intended purpose, function, or effect.  <b>Do NOT award a point if any one of the following is true:</b> <ul style="list-style-type: none"> <li>• there is no artifact;</li> <li>• the artifact is not a computational artifact;</li> <li>• the innovation identified in the artifact does not match the innovation described in the written response;</li> <li>• the artifact does not identify the innovation clearly;</li> <li>• the artifact does not illustrate, represent or explain the innovation’s intended purpose, function, or effect;</li> <li>• the artifact illustrates a feature of the innovation instead of the purpose, function, or effect; or</li> <li>• 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.</li> </ul>	<ul style="list-style-type: none"> <li>• 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.</li> <li>• A computing innovation is an innovation that includes a computer or program code as an integral part of its functionality.</li> </ul>
Row 2  Analyzing Impact of Computing	<b>RESPONSE 2A</b>	<ul style="list-style-type: none"> <li>• States a fact about the correctly identified computing innovation’s intended purpose OR function.</li> </ul>	<b>Do NOT award a point if:</b> <ul style="list-style-type: none"> <li>• the identified innovation is not a computing innovation; or</li> <li>• the written statement gives an effect (which is required for the scoring criteria in Row 3, not Row 2).</li> </ul>	<ul style="list-style-type: none"> <li>• A computing innovation is an innovation that includes a computer or program code as an integral part of its functionality.</li> <li>• 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.</li> <li>• Purpose means the intended goal or objective of the innovation.</li> <li>• Function means how the innovation works (e.g., consumes and produces data).</li> </ul>
Row 3  Analyzing Impact of Computing	<b>RESPONSE 2C</b>	<ul style="list-style-type: none"> <li>• Identifies at least ONE effect of the identified or described computing innovation.</li> </ul>	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.  <b>Do NOT award a point if any one of the following is true:</b> <ul style="list-style-type: none"> <li>• the described innovation is not a computing innovation;</li> <li>• the response does not state an effect (The purpose or function of the computing innovation is not the effect of the innovation.); or</li> <li>• 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).</li> </ul>	<ul style="list-style-type: none"> <li>• An effect may be an impact, result, outcome, etc.</li> </ul>
Row 4  Analyzing Impact of Computing	<b>RESPONSE 2C</b>	<ul style="list-style-type: none"> <li>• Identifies a beneficial effect of the identified or described computing innovation.</li> <li style="text-align: center;"><b>AND</b></li> <li>• Identifies a harmful effect of the identified or described computing innovation.</li> </ul>	Responses that earn this point will also earn the point for Row 3.  Responses should be evaluated on the rationale provided in the response not on the interpretation or inference on the part of the scorer.  <b>Do NOT award a point if any one of the following is true:</b> <ul style="list-style-type: none"> <li>• the described innovation is not a computing innovation;</li> <li>• the response is missing the adjectives harmful or beneficial (or synonyms thereof);</li> <li>• the response is missing a plausible beneficial effect;</li> <li>• the response is missing a plausible harmful effect; or</li> <li>• 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).</li> </ul>	<ul style="list-style-type: none"> <li>• An effect may be an impact, result, outcome, etc.</li> <li>• 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.</li> </ul>

Reporting Category	Task	Scoring Criteria	Decision Rules	Scoring Notes
Row 5 Analyzing Impact of Computing	RESPONSE 2C	<ul style="list-style-type: none"> <li>Explains how ONE of the identified effects relates to society, economy, or culture.</li> </ul>	<p>Reponses 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><b>Do NOT award a point if any one of the following is true:</b></p> <ul style="list-style-type: none"> <li>the described innovation is not a computing innovation; or</li> <li>the explanation does not connect one of the effects to society, economy, or culture.</li> </ul>	<ul style="list-style-type: none"> <li>Effects need to be related to society, economy, or culture and need to be connected to a group or individuals. Examples include but are not limited to: <ul style="list-style-type: none"> <li>The innovation and impact of social media online access varies in different countries and in different socioeconomic groups (EK 7.4.1A)</li> <li>Mobile, wireless, and networked computing have an impact on innovation throughout the world (EK 7.4.1B)</li> <li>The global distribution of computing resources raises issues of equity, access and power (EK 7.4.1C)</li> <li>Groups and individuals are affected by the “digital divide” (EK 7.4.1D)</li> <li>Networks and infrastructure are supported by both commercial and governmental initiatives (EK 7.4.1E)</li> </ul> </li> </ul>
Row 6 Analyzing Data and Information	RESPONSE 2D	<ul style="list-style-type: none"> <li>Identifies the data that the identified or described computing innovation uses</li> </ul> <p><b>AND</b></p> <ul style="list-style-type: none"> <li>Explains how that data is consumed, produced, OR transformed.</li> </ul>	<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><b>Do NOT award a point if any one of the following is true:</b></p> <ul style="list-style-type: none"> <li>the described innovation is not a computing innovation;</li> <li>the response does not state the specific name of the data or simply says “data”;</li> <li>the response confuses or conflates the innovation with the data: response fails to explain what happens to the data; or</li> <li>the response confuses the source of the data with the data.</li> </ul>	<ul style="list-style-type: none"> <li>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.</li> <li>Data collection devices (e.g. sensors, cameras, etc.) are not data.</li> <li>Large data sets include data such as transactions, measurements, texts, sounds, images, and videos. (EK 3.2.2A)</li> </ul>
Row 7 Analyzing Data and Information	RESPONSE 2D	<ul style="list-style-type: none"> <li>Identify one data storage, data privacy, OR data security concern related to the identified or described computing innovation.</li> </ul>	<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><b>Do NOT award a point if any one of the following is true:</b></p> <ul style="list-style-type: none"> <li>the described innovation is not a computing innovation; or</li> <li>the response identifies or describes a concern that is not related to data.</li> </ul>	
Row 8 Finding and Evaluating Information	RESPONSE 2E & ARTIFACT / WRITTEN RESPONSE	<ul style="list-style-type: none"> <li>References, through in-text citation, at least 3 different sources.</li> </ul>	<p>The in-text citations can be in either the artifact or the written response.</p> <p>The in-text citations may be oral in the computational artifact.</p> <p><b>Do NOT award a point if any one of the following is true:</b></p> <ul style="list-style-type: none"> <li>the response contains a list of sources only, no in-text citations;</li> <li>the response contains less than three in-text citations; or</li> <li>there are fewer than three sources cited, even if there are three or more in-text citations.</li> </ul>	<ul style="list-style-type: none"> <li>In-text citations may be provided in any way that acknowledges the source: <ul style="list-style-type: none"> <li>According to...” or “As written in the New York Times...”</li> <li>Parenthetical</li> <li>Footnotes</li> <li>Numerical superscripts with corresponding footnote</li> <li>Number system with a corresponding reference</li> </ul> </li> </ul>

# AP<sup>®</sup> COMPUTER SCIENCE PRINCIPLES 2018 SCORING COMMENTARY

## Explore Performance Task

### 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 computational artifact identifies a computing innovation, blockchain, and illustrates a function of blockchain: "verify your transaction and add the data to a digital ledger."

#### Row 2:

The response earned the point for this row.

The response states that "blockchain functions as a series of computers, called nodes."

#### Row 3:

The response earned the point for this row.

The response gives the effect: "blockchain will save money on financial services infrastructure ... to decommission expensive systems that are currently used to secure transactions."

#### Row 4:

The response earned the point for this row.

The response gives the beneficial effect: "blockchain will save money on financial services infrastructure ... to decommission expensive systems that are currently used to secure transactions."

The response gives the harmful effect that because blockchain uses a significant amount of energy, "Society itself, namely the environment, is harmed. If a growing technology uses more energy, we are forced to burn more resources to create electricity."

#### Row 5:

The response earned the point for this row.

The response explains how the harmful effect relates to society: "Society itself, namely the environment, is harmed. If a growing technology uses more energy, we are forced to burn more resources to create electricity."

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## Explore Performance Task (continued)

### Row 6:

The response earned the point for this row.

The response identifies the data: "Each block of data contains a pointer to the previous block, a timestamp, and transaction data." It then states that "It computes by taking the data and runs it through algorithms to verify the identity of the request," which describes how the data is consumed.

### Row 7:

The response earned the point for this row.

The response identifies the privacy concern: "Bitcoin relies on a public Blockchain, a system of recording transactions that allows anyone to read or write transactions."

### Row 8:

The response earned the point for this row.

The response contains three in-text citations that refer to references provided in the response.

### 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:

This response earned a point for this row.

The artifact identifies the computing innovation as Virtual Reality and illustrates that the purpose is to enhance or replace the world around you with a virtual one that can be modified.

### Row 2:

This response earned a point for this row.

The response states a correct fact: "It can be used for things such as online shopping, gaming, and training."

### Row 3:

This response earned a point for this row.

The response identifies one effect of the innovation: "Virtual reality has the potential to change many things about the way we interact with computers and our environment. Since it is easier to focus on your surroundings when not looking at a phone, augmented reality has the potential to cut down on distracted walking — or cycling — related accidents."

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## 2018 SCORING COMMENTARY

### Explore Performance Task (continued)

**Row 4:**

This response earned a point for this row.

The response identifies both a beneficial and a harmful effect.

A beneficial effect is that "Since it is easier to focus on your surroundings when not looking at a phone, augmented reality has the potential to cut down on distracted walking — or cycling — related accidents." The response identifies this as a benefit in the sentence prior when it states that it provides "us with beneficial information."

A harmful effect is that "people may become absorbed in the virtual world, and only interact through it instead of through face-to-face communication."

**Row 5:**

This response earned a point for this row.

The response explains how the harmful effect impacts the society by stating that "However, a harmful effect virtual reality may have on society is that people may become absorbed in the virtual world, and only interact through it instead of through face-to-face communication."

**Row 6:**

The response earned a point for this row.

The response identifies the data as "image, motion, orientation, and distance."

The response explains how the data is consumed: "All this data is consumed by the headset to allow the headset to detect user input and its surroundings. This data is then transformed by the program running on the headset to determine what to show the user and is outputted to the user in the form of image and audio data."

**Row 7:**

The response earned a point for this row.

The response identifies a data privacy concern: " the potential ability for companies to access the video or other sensor data recorded by these headsets, which could be used for things without your consent." It goes on to say, "someone else with access could also see this and may have the ability to find them against his/her will."

**Row 8:**

The response earned a point for this row.

The response uses names for in-text citations that are matched to the references.

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## 2018 SCORING COMMENTARY

### Explore Performance Task (continued)

#### Sample: C

**Row 1: 1**

**Row 2: 1**

**Row 3: 1**

**Row 4: 1**

**Row 5: 0**

**Row 6: 1**

**Row 7: 1**

**Row 8: 1**

#### **Row 1:**

The response earned the point for this row.

The artifact provides an explanation of the computing innovation's intended function stating that "Apple Pay uses tokenization in which it creates a device account number for each card."

#### **Row 2:**

The response earned a point for this row.

The response states a fact about the computing innovation: "allow users to make secure purchases with their phones."

#### **Row 3:**

The response earned a point for this row.

The response identifies an effect of the innovation: "making it much more difficult to steal the user's credit card information, proving very beneficial for those who use Apple Pay."

#### **Row 4:**

The response earned a point for this row.

The response states a beneficial and harmful effect of the innovation.

The response identifies a beneficial effect of the innovation as "making it much more difficult to steal the user's credit card information, proving very beneficial for those who use Apple Pay."

The response identifies a harmful effect of the innovation as "dissociating people with the money they are spending. This can prove harmful when it causes people [to] use apple pay to buy things they cannot afford."

#### **Row 5:**

The response did not earn a point for this row.

The response identifies that Apple Pay is "very beneficial for those who use Apple Pay" but doesn't further explain how the effect is related to this societal group.

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## Explore Performance Task (continued)

### Row 6:

The response earned a point for this row.

The response identifies data by stating that "Apple creates a Device Account Number in place of the credit card number that is stored with the bank, on the device, and on Apple's servers, and then erases the credit card number from its database."

The response explains how data is output from the device in that "When paying with Apple Pay, the paying device transmits the user's Device Account Number over an encrypted NFC connection to the terminal. The Device Account Number is then sent to the bank and verified."

### Row 7:

The response earned a point for this row.

The response identifies a data security concern by stating that "When registering a new card on an unsecured public Wi-Fi network, a cybercriminal can spoof a user's mobile wallet registration system in which the user must enter their card's data."

### Row 8:

The response earned a point for this row.

The response uses numbers in brackets for in-text citations that are matched to the references.

### 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 a point for this row.

The artifact identifies the computing innovation as Microsoft HoloLens and illustrates the purpose is to "produce a realistic 3D hologram that the user can interact with."

### Row 2:

The response earned a point for this row.

The response states a correct fact: "The intended purpose of the device is to produce holograms in the environment that the user is using and allow the user to see and interact with the hologram like a real-world object."

### Row 3:

The response earned a point for this row.

The response identifies one effect of the innovation; it can "speed up the design process" of cars and other products.



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## Explore Performance Task (continued)

### Row 4:

The response earned a point for this row.

The response identifies both a beneficial and a harmful effect of the computing innovation.

The beneficial effect is that it can "speed up the design process" of cars and other products.

A harmful effect is that Microsoft HoloLens may cause gaming addiction.

### Row 5:

The response earned a point for this row.

The response explains how the harmful effect impacts the society: "The fact that the Microsoft HoloLens can make the gaming experience so realistic can be a problem in the society as users of the Microsoft HoloLens can be addicted to it."

### Row 6:

The response does not earn a point for this row.

The response does not identify the data, but rather lists data collection devices such as "cameras, microphones, and a light sensor."

### Row 7:

The response earned a point for this row.

The response identifies a data security concern as "the data captured by the cameras and the sensors may be altered by a malicious program on the device, making the device's Central Processing Unit and Holographic Processing Unit output realistic altered holographic images."

### Row 8:

The response earned a point for this row.

The response uses numbers in parenthesis for in-text citations that are matched to the references.

## Sample: E

**Row 1: 0**

**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 did not earn a point for this row.

The artifact does not provide an illustration, representation, or explanation of the computing innovation's intended purpose, function, or effect.

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## 2018 SCORING COMMENTARY

### Explore Performance Task (continued)

**Row 2:**

The response earned a point for this row.

The response states a fact about the computing innovation: "Bitcoin is a digital currency that has become highly popular among investors and traders alike."

**Row 3:**

The response earned a point for this row.

The response identifies an effect of the innovation as it "makes investors have another way to invest besides in the stock market," because it can be used internationally and doesn't have a language or exchange rate barriers.

**Row 4:**

The response earns a point for this row.

The response identifies a beneficial effect of the innovation as, "makes investors have another way to invest besides in the stock market," because it can be used internationally and doesn't have a language or exchange rate barriers.

The response identifies a harmful effect of the innovation as "if Bitcoin's value were to crash, there would be a large crisis among investors and it could lead to the stock market crashing along with it."

**Row 5:**

The response earned a point for this row.

The response connects the beneficial effect: "Economically this makes investors have another way to invest besides in the stock market."

**Row 6:**

The response did not earn a point for this row.

The response does not identify the data and explain how that data is consumed, produced, or transformed.

The response describes how Bitcoin functions rather than the data and its use of the data.

**Row 7:**

The response earned a point for this row.

The response raises a data privacy concern that username data is maintained on "a large ledger that is kept on an open server that can only be changed by transactions. A user makes an account and a username that will be seen on the transaction ledger. This ledger will include every transaction ever made with a Bitcoin."

**Row 8:**

The response earned a point for this row. There are at least three in-text citations with corresponding references listed.

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## 2018 SCORING COMMENTARY

### Explore Performance Task (continued)

#### Sample: F

**Row 1: 0**

**Row 2: 1**

**Row 3: 1**

**Row 4: 0**

**Row 5: 1**

**Row 6: 0**

**Row 7: 1**

**Row 8: 1**

#### **Row 1:**

The response did not earn the point for this row.

The artifact does not provide an illustration, representation, or explanation of the computing innovation's intended purpose, function, or effect.

#### **Row 2:**

The response earned a point for this row.

The response states a fact that the computing innovation "is defined as websites and applications that enable users to create and share content or to participate in social networking."

#### **Row 3:**

The response earned a point for this row.

The response identifies an effect of the innovation as it "is the worst thing for children's health as it has been directed towards signs of depression and that there may also be links to an increase in cyberbullying, worsening sleep, and feelings of social isolation and anxiety."

#### **Row 4:**

The response did not earn a point for this row.

The response does not identify a beneficial effect, but it does identify a harmful effect.

The response states uses of the innovation (being able to find a job) without identifying beneficial effects. The statement "they will benefit in an economic way" does not identify the beneficial effect, such as being able to support oneself and make purchases.

The response identifies a harmful effect of the innovation as "social media is the worst thing for children's health as it has been directed towards signs of depression and that there may also be links to an increase in cyberbullying, worsening sleep, and feelings of social isolation and anxiety."

#### **Row 5:**

The response earned a point for this row.

The response connects the harmful effect explaining that the innovation is "affecting our society in a way that can be harmful to the children and possibly adults through the use of social media."

#### **Row 6:**

The response did not earn a point for this row.

The response does not identify data that the innovation uses, rather it simply states that "data is necessary," nor how it is consumed, transformed, or output.

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## Explore Performance Task (continued)

### Row 7:

The response earned a point for this row.

The response does identify a concern "for breach of data" in that "If some people don't take actions on their privacy, such as sharing their profiles to the rest of the world, then they may allow other people to find out personal information about them such as gender, where they live, how old they are, and other possible information."

### Row 8:

The response earned a point for this row.

The response contains three in-text citations using parenthetical notation with matching references.

### Sample: G

**Row 1: 1**

**Row 2: 1**

**Row 3: 1**

**Row 4: 0**

**Row 5: 0**

**Row 6: 1**

**Row 7: 0**

**Row 8: 0**

### Row 1:

This response earned a point for this row.

The artifact identifies the computing innovation as Electromyographic (EMG) prosthetic limbs and illustrates the purpose is to provide those who are missing limbs with an opportunity to live a normal life.

### Row 2:

This response earned a point for this row.

The response states a correct function: "... EMG prosthesis unlocks the possibility for virtually natural motion and limited sensations for those missing limbs."

### Row 3:

This response earned a point for this row.

The response identifies in response 2a the effect of the innovation: "EMG prosthesis is meant to provide those who are missing limbs an opportunity to live a normal life." The benefit identified in response 2c, "provision of limbs to those who were either born without limbs or lost them in an accident," is not an effect of the innovation but rather the purpose for this innovation.

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## Explore Performance Task (continued)

### Row 4:

This response did not earn a point for this row.

The response identifies a harmful effect: "Unfortunately there might arise instances of accidental or unintended motion due to the open loop design of the prosthetics."

The beneficial effect in response 2c, "... it's provision of limbs to those who were either born without limbs or lost them in an accident," represents a purpose for using this technology. The effect identified in 2a, "EMG prosthesis is meant to provide those who are missing limbs an opportunity to live a normal life," is not identified as beneficial or harmful.

### Row 5:

This response did not earn a point for this row.

The beneficial effect identified in 2c, "The primary benefit EMG prosthesis has had on society is it's provision of limbs to those who were either born without limbs or lost them in an accident," is a purpose for using this computing innovation, rather than an effect of the innovation.

### Row 6:

The response earned a point for this row.

The response identifies the data as myoelectric signals.

The response explains how the data is consumed: "These prosthetics simply consumes the electromyographic data sent to specific muscles on the user's body from the brain. This data is received through the EMG sensors that are attached to the proper muscles on the wearer. These EMG signals, once received, are transmitted to a signal processor that identifies which sensor is transmitting a signal then appropriately actuates a combination of cervos and motors in order to properly move the prosthetic as if an appendage was there."

### Row 7:

The response did not earn a point for this row.

The response does not identify a concern that is related to the data.

### Row 8:

The response did not earn a point for this row.

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

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## 2018 SCORING COMMENTARY

### Explore Performance Task (continued)

#### Sample: H

**Row 1: 1**

**Row 2: 1**

**Row 3: 0**

**Row 4: 0**

**Row 5: 0**

**Row 6: 0**

**Row 7: 1**

**Row 8: 1**

#### **Row 1:**

The response earned the point for this row.

The computational artifact illustrates functions of the iPhoneX such as Animojis, Face Id, and portrait mode selfie.

#### **Row 2:**

The response earned the point for this row.

The response states that "The purpose and function of iPhone x is to make a improved technology with new features like the face ID, entirely screen, improved display, etc."

#### **Row 3:**

The response did not earn the point for this row.

All the identified effects are features of the iPhoneX. For example, the OLED display, and the glass back are features of the phone.

#### **Row 4:**

The response did not earn a point for this row.

While the response attempts to describe a beneficial and a harmful effect of the iPhoneX, the response identifies features of the phone, not effects of the phone.

#### **Row 5:**

The response did not earn a point for this row.

The response does not relate any of the effects to society, economy, or culture.

#### **Row 6:**

The response did not earn a point for this row.

The input data is not identified. The response does mention audio and voice as output, which would be produced by the phone, not used by the phone.

#### **Row 7:**

The response earned the point for this row.

A security concern is identified: "The face ID has some security concerns, someones [sic] can crack the Face ID with a composite mask of 3-D printed plastic, silicone, makeup, and simple paper cutouts, which in combination trick an iPhone X into unlocking"

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## Explore Performance Task (continued)

### Row 8:

The response earned the point for this row.  
Three references and three in-text citations are included.

### Sample: I

#### Row 1: 1

#### Row 2: 1

#### Row 3: 1

#### Row 4: 0

#### Row 5: 0

#### Row 6: 0

#### Row 7: 0

#### Row 8: 0

### Row 1:

This response earned a point for this row.  
The artifact identifies the computing innovation as Apple Watch Series 3 and illustrates the purpose as allowing users to make calls, send text messages, and track their health.

### Row 2:

This response earned a point for this row.  
The response states a correct fact; it tracks one's health.

### Row 3:

This response earned a point for this row.  
The response identifies in 2a one effect of the innovation as "to help people to not get in a car crash."

### Row 4:

This response did not earn a point for this row.  
The response explains the beneficial effect on society as tracking one's health. No harmful effect related to the innovation's intended purpose is presented. The harmful effect of the battery draining is not an effect but rather commentary regarding the product's design.

### Row 5:

The response did not earn a point for this row.  
The response does not connect "help people to not get in a car crash" to society, economy, or culture.

### Row 6:

The response did not earn a point for this row.  
The response does not specify the specific name of the data but rather just refers to it as data.

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## Explore Performance Task (continued)

### Row 7:

The response did not earn a point for this row.

The response identifies storage size of the computing innovation and access to your device, but these are not related to the data.

### Row 8:

The response did not earn a point for this row.

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

### Sample: J

#### Row 1: 1

#### Row 2: 0

#### 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 artifact provides an illustration of the purpose for Human Genome Sequencing. Even though computing is involved in order to complete Human Genome Sequencing, it is not considered a computing innovation. The response can earn this row even though it isn't a computing innovation.

### Row 2:

The response did not earn a point for this row.

Even though in order to complete Human Genome Sequencing, computing is involved, it is not considered a computing innovation.

### Row 3:

The response did not earn a point for this row.

The described innovation connected to the effect is not a computing innovation.

### Row 4:

The response did not earn a point for this row.

The described innovation connected to the effect is not a computing innovation.

### Row 5:

The response did not earn a point for this row.

The described innovation connected to the effect is not a computing innovation.



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## Explore Performance Task (continued)

### 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.

### Row 7:

The response did not earn a point for this row.

Even though cloud computing is a computing innovation and mentioned in this prompt, it is unclear how this is connected to the data storage concerns.

### Row 8:

The response did not earn a point for this row.

While there are three references, there are only two in-text citations.