AP® Computer Science Principles — Explore Performance Task
Scoring Guidelines and Notes

December 2016

Scoring Guidelines

The Explore Performance Task will be evaluated based upon the 7 discrete criteria listed below. Each criteria is scored individually on a binary scale (i.e., each criteria can earn a score of 1 or 0) for a total of 7 possible points.

The first criteria is evaluated based upon the computational artifact, using the written response as needed. The remaining six criteria are evaluated based upon the written response.

Computational Artifact (and Written Response as needed)

1 **Using Development Processes and Tools:** The computational artifact identifies the **computing innovation** and provides an illustration, representation, or explanation of the computing innovation's intended purpose, function, or effect.

Written Response

2 **Analyzing Impact of Computing:** States a plausible fact about the **computing innovation's** intended purpose or function.

3 **Analyzing Impact of Computing:** Identifies at least ONE effect of the **computing innovation**.

4 **Analyzing Impact of Computing:** Identifies a beneficial effect AND a harmful effect of the **computing innovation**. Explains how ONE of the identified effects impacts or has the potential to impact society, economy, or culture.

5 **Analyzing Data and Information**: Identifies the data that the **computing innovation** uses. Explains how that data is consumed, produced, OR transformed.

6 **Analyzing Data and Information**: Identifies one storage, privacy, OR security concern. Explains how the concern is related to the **computing innovation**.

7 **Finding and Evaluating Information**: Provides inline citations of at least 3 attributed sources within the written response. The citations must be used to justify the response.

Scoring Notes

Criteria	Scoring Notes	Examples that will earn a point for each criteria	Examples that will not earn a point for each criteria
Using Development Processes and Tools Criteria 1: The computational artifact identifies the **computing innovation** and provides an illustration, representation, or explanation of the computing innovation's intended purpose, function, or effect. LO: 1.2.1 OR 1.2.2 Weighted: 20%	• This score is based on the computational artifact. As needed, the written response can be used to provide additional information required to earn this point. • The name of the computing innovation needs to be explicitly stated either in the written response, computational artifact, OR in sound within the computational artifact.	This example includes a computational artifact that explicitly states the name of the computing innovation in the voice over of the video and explains its function. • The submission includes a video about the Synapse chip with voice over explaining that the function of the chip is to recognize patterns and process images, sound, and other sensory data accurately at a high rate of speed.	This example does not include a computational artifact or a written response that names the computing innovation and does not explain the purpose, function, or effect of the computing innovation. • The submission includes an image and a written response without the name of the computing innovation.
Analyzing Impact of Computing Criteria 2: States a plausible fact about the **computing innovation's** intended purpose or function. LO: 7.1.1, 7.3.1 Weighted: 10%	• This score should be based solely on the written responses. • The statement should include the intended purpose or function of the computing innovation from a design perspective. • The response can include this statement with or without an attribution through citation or reference.	This example includes a plausible fact about the computing innovation's intended purpose. • Cloud computing allows a user to effectively and easily store files of various types, as well as share these files with devices such as laptops, tablets, or smartphones. This example includes a plausible fact about the computing innovation's intended function. • Drones can fly at 30 mph and communicate with other drones (e.g., sending location or temperature data) to work together to complete a task.	These examples are facts or opinions about the computing innovation. They do not state a plausible fact about the computing innovation's intended purpose or function. • Cloud computing is not expensive to purchase. • The Ehang184 drone is as big as a small car and has 8 propellers on 4 arms
Analyzing Impact of Computing Criteria 3: Identifies at least ONE effect of the **computing innovation**.	• This score should be based solely on the written responses. • The response can provide a beneficial effect or a harmful effect.	This example identifies one effect of the computing innovation. • A beneficial effect of a self-driving car is the ability to avoid an accident with other vehicles on a predetermined path from one location to another.	These examples are facts or opinions about the computing innovation. They do not identify an effect of the computing innovation.

Criteria	Scoring Notes	Examples that will earn a point for each criteria	Examples that will not earn a point for each criteria
LO: 7.1.1, 7.3.1 Weighted: 15%	• The response does not need to describe the effect. • The response does not need to connect the effect with society, economy or culture. • The effect can be the same as one of the effects identified in criteria 4.		• More self-driving cars are being manufactured for people who can afford to purchase these cars. • Drones are mainly used by military personnel during special missions.
Analyzing Impact of Computing Criteria 4: Identifies a beneficial effect AND a harmful effect of the **computing innovation**. Explains how ONE of the identified effects impacts society, economy, or culture. LO: 7.1.1, 7.3.1, 7.4.1 Weighted: 15%	• This score should be based solely on the written responses. • The response can include similar words that mean "benefit" and "harmful". • There are 3 aspects required to meet this criteria: o Identifying a beneficial effect; o Identifying a harmful effect; and o Explicitly explaining and connecting ONE of the effects to society, economy or culture. • "Hacking" can be stated as a valid effect **only if** the computing innovation is a hacking device or is intended for hacking. • Students who receive this point will get a point in criteria 3 as well.	This example identifies a beneficial effect and a harmful effect of the computing innovation, and explains how the beneficial effect impacts economy. • **A beneficial effect** of self-driving cars is the ability to avoid an accident with other vehicles on a predetermined path from one location to another. According to the Association of Unmanned Vehicle System International (AUVSI), the cost of car accidents is $576M and 42 lives daily. [3] **The functionality of self-driving cars (e.g., ability to avoid accidents) can impact the economy** by saving users from unforeseen financial hardship in the form of car repairs, and medical and legal expenses. However, because self-driving cars rely on cameras and laser sensors to monitor their position on the road, **a negative effect of this functionality is the inability to do this effectively during inclement weather** such as rain or fog when the lines drawn on the road are difficult to see, and especially if they are covered with snow. In these instances, self-driving cars do not function accurately and accidents can occur under these circumstances.	While this example explains one impact of the computing innovation, it does not identify a beneficial effect or a harmful effect of the computing innovation. • According to the Association of Unmanned Vehicle System International (AUVSI), the cost of car accidents is $576M and 42 lives daily.[3] The functionality of self-driving cars(e.g., the ability to avoid accidents) can impact the economy by saving users lives. While this example identifies a beneficial effect of the computing innovation, it does not identify a harmful effect, and it does not explain how a beneficial effect or a harmful effect impacts society, economy, or culture. • A beneficial effect of the HoloLens, a holographic computer, is the ability to visually see places that normally humans would not be able to see, such as the bottom of the ocean or the surface of Mars.

Criteria	Scoring Notes	Examples that will earn a point for each criteria	Examples that will not earn a point for each criteria
Analyzing Data and Information Criteria 5: Identifies the data that the **computing innovation** uses. Explains how that data is consumed, produced, OR transformed. LO: 3.3.1 Weighted: 15%	• This score should be based solely on the written responses. • There are 2 aspects required to meet this criteria: o Identifying specific data used by the computing innovation; and o Explaining how data is consumed, produced or transformed by the computing innovation.	This example identifies the data the computing innovation uses. Though this criteria only requires one explanation of how the data is consumed, produced, OR transformed, this example explains how the data is consumed and transformed. • The HoloLens has multiple built-in cameras that capture video of your surroundings, and sensors that track your movements and gestures. [2] These data are fed into an on-board graphics processing unit (GPU) and a holographic processing unit (HPU) that transform the data (e.g., your surroundings) into augmented reality (AR) and holograms.	This example states a fact about the computing innovation. It does not identify the data the computing innovation uses and it does not explain how the data it uses is consumed, produced, or transformed. • Self-driving cars monitor their position on the road with cameras and sensors. This example explains how data is consumed and transformed but it does not identify the data the computing innovation uses. • The data the HoloLens collects is fed into an on-board graphics processing unit (GPU) and a holographic processing unit (HPU) that transform the data into augmented reality (AR) and holograms.
Analyzing Data and Information Criteria 6: Identifies one storage, privacy, OR security concern. Explains how the concern is related to the **computing innovation**. LO: 3.3.1 Weighted: 15%	• This score should be based solely on the written responses. • There are 2 aspects required to meet this criteria: o Explicitly stating a storage, privacy, or security concern; and o Explaining how the concern is related to the computing innovation.	This example identifies a privacy concern and explains how the privacy concern is related to the computing innovation. • An app used by emergency medical responders stores patient information that can be quickly accessed. Patients can provide permission for medical responders to access their data in order to receive necessary medical treatment but patients have privacy concerns with the use of this app. The app provides the ability to share medical information easily to unauthorized users and personnel. Because patient medical information is protected under HIPAA [1], access to the data provided by this app should be restricted to authorized medical responders.	This example does not identify a storage, privacy, or security concern and it does not explain how a storage, privacy, or security concern is related to the computing innovation. • An app used by emergency medical responders stores patient information that can be quickly accessed. Because patient medical information is protected under HIPAA [1], access to the data provided by this app should be restricted to authorized medical responders.

Criteria	Scoring Notes	Examples that will earn a point for each criteria	Examples that will not earn a point for each criteria
Finding and Evaluating Information Criteria 7: Provides inline citations of at least 3 attributed sources with the written response. The citations must be used to justify the response. LO 7.5.2 Weighted: 10%	• Submissions that include only a bibliography (or a list of references) will not receive this point. The submission must also include at least three inline citations. • Citation styles can include but are not limited to name, superscript, number system. The type of inline citations used does not have to be done correctly. Any format works as long as it is clear.	Together, these examples provide a collection of inline citations of three different attributed sources that are used to justify the response. • Because patient medical information is protected under HIPAA [1], access to the data provided by this app should be restricted to authorized medical responders. • The HoloLens has multiple built-in cameras that capture video of your surroundings, and sensors that track your movements and gestures. [2] • According to the Association of Unmanned Vehicle System International (AUVSI), the cost of car accidents is $576M and 42 lives daily. [3] [1] "188-Why is the HIPAA privacy rule needed," HHS.gov, 2015. [Online]. Available: http://www.hhs.gov/hipaa/for-professionals/faq/188/why-is-the-privacy-rule-needed/index.html. Accessed: Sept. 8, 2016. [2] S. Charara, "Microsoft HoloLens: Everything you need to know about the $3000 AR heardset," Warable.com, 2016. [Online]. Available: https://www.wareable.com/microsoft/microsoft-hololens-everything-you-need-to-know-about-the-futuristic-ar-headset-735 [3] H. Logic, "Daily impact of self driving cars in the United States – Association for Unmanned Systems International," in AUVSI All Things Unmanned [Online]. Available: http://www.auvsi.org/auvsiresources/knowledge/dailylossesinaworldwithoutselfdrivingcars. Accessed: Sept. 8, 2016.	These examples do not include inline citations of any attributed sources. • Because patient medical information is protected, access to the data provided by this app should be restricted to authorized medical responders. • The HoloLens has multiple built-in cameras that capture video of your surroundings, and sensors that track your movements and gestures. • A beneficial effect of a self-driving car is the ability to avoid an accident with other vehicles, which can cost both money and lives.

A **computational artifact** without citation or reference for image(s), video, or music used in the creation of the computational artifact, and a **code segment(s)** written by someone else used in a program without citation or reference, are all considered plagiarized work. The work should be returned to the student to add the necessary citations or references before submitting it to College Board.