PARTICIPANT GUIDE

Explore Stimulus

Hook

What is a computing innovation? The AP® College Board® defines a computing innovation as something that includes a computer or program code as an integral part of its functionality.
So how do you know if a computing innovation is a computing innovation?

Let's play a game of Kahoot to see how much you *really* know about computing innovations! To play the game, follow the on-screen instructions given by your facilitator.

You will encounter the following questions in your Kahoot game:

1. Where can we find computers?
    a. Everywhere
    b. People's cars
    c. Your backpack
    d. On your wrist

2. Is there a machine designed to help with thinking work?
    a. False
    b. True

3. Pioneers of computer science realized the thinking machine had to complete four different tasks. What are they?
    a. Processing, thinking, input, storage
    b. Store information, output, processing, inform
    c. Input, storage, processing, output
    d. Input, output, change information, thinking

4. What makes a computer a computer?
    a. The size of the computer
    b. Storage and processing
    c. The motherboard
    d. Input, storage, processing, output

5. Which of these is an example of input?
    a. Keystrokes from a keyboard
    b. Microphone
    c. Camera
    d. All of the above

6. Which of these is an example of storage and processing?
    a. Cable
    b. Memory
    c. Computer monitor
    d. Keyboard

7. Which of the following is an example of output?
    a. Display with video
    b. Signals to control a robot
    c. Display with text
    d. All of the above

![National Math + Science Initiative logo] **Principles**

Mini Lesson 1

A **computer** is an electronic device that manipulates information, or data. It has the ability to **store**, **retrieve**, and **process** data. The four parts that make up a computer are input, output, processing, and storage. A computing innovation is something that includes a computer or program code as an integral part of its functionality.

Mini Lesson 2

Choose an innovation from the list below and answer the following questions.
- Virtual Reality
- Computer Watch (Apple Watch, golf watch, Fitbit etc)
- Robots
- Computers in a car
- Social Media(Facebook, Twitter, Instagram, Tiktok etc)

1. What is the input?

2. How is the data being processed?

3. What is the output?

Computer innovations can have large impacts on our society, economy and culture. Sometimes those impacts are unintended. We can separate these consequences into two buckets: beneficial and harmful.

- A **beneficial** effect is defined as a helpful or positive effect or outcome on economy, society, or culture.
- A **harmful** effect is defined as a negative effect or unintended consequence on the economy, society, or culture.

4. Name one beneficial effect and one harmful effect of the computing innovation you chose above.

Mini Lesson 3

Single Select Questions with Reading Passage is a set of 5 questions associated with a reading passage about a computing innovation. These questions assess Computational Thinking Practices 3 and 5. They include:
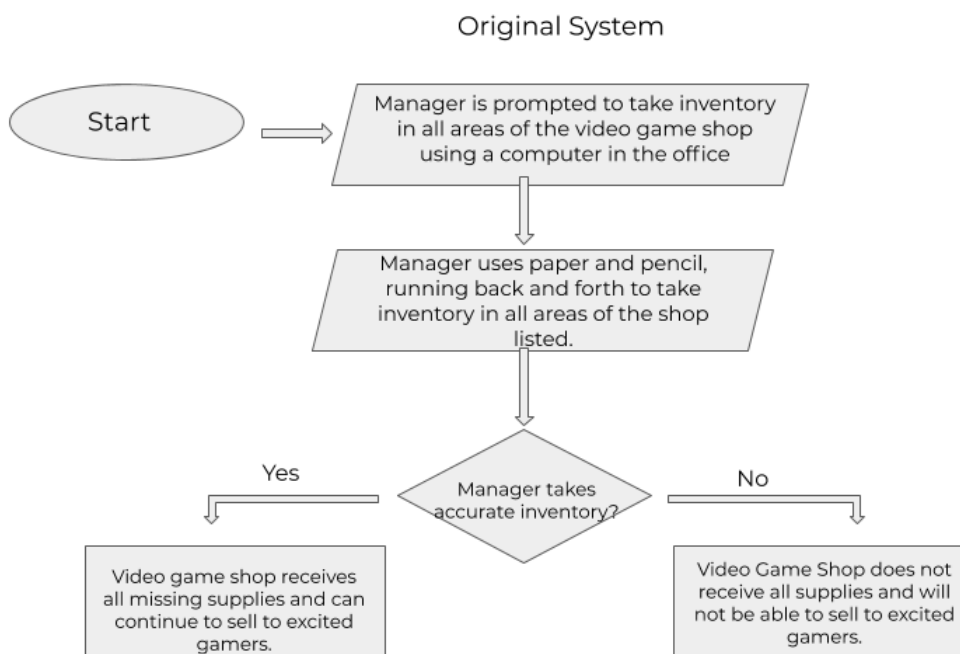
- Questions about the innovation's use of data.
- Questions about the benefits and harmful effects of the innovation.
- Questions about privacy/security/storage concerns.
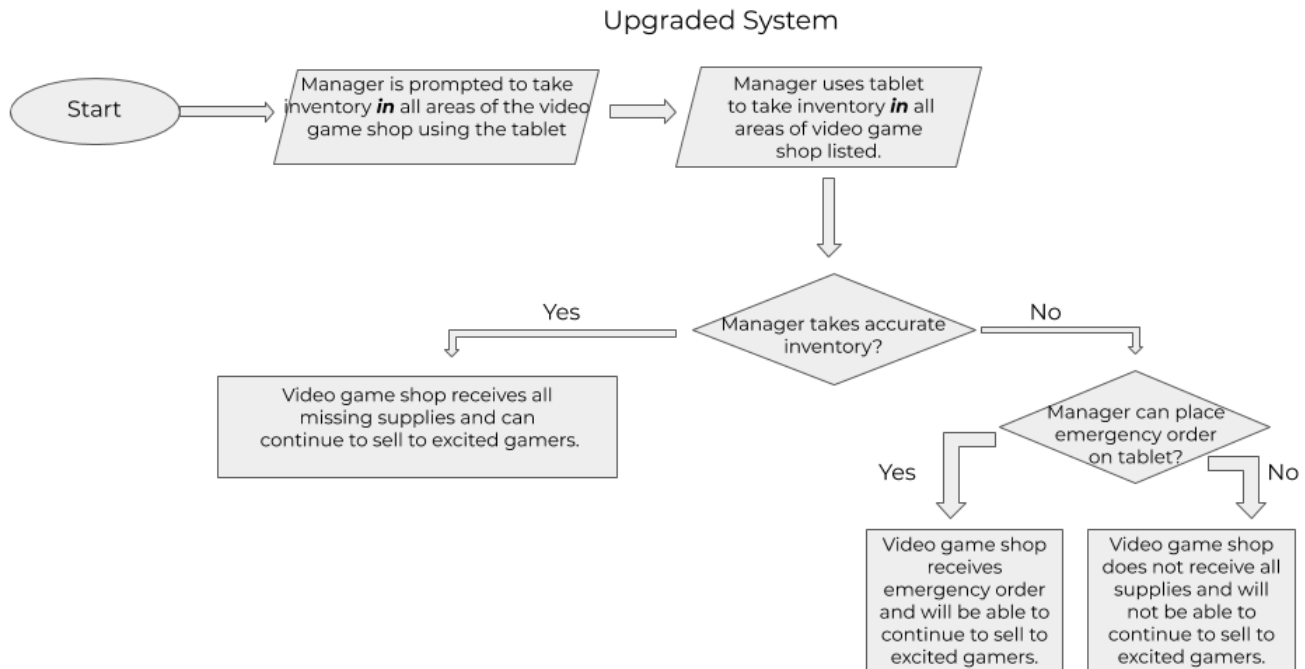- Questions about the function/purpose/effect of the innovation.

Guided Problem-Solving Activities

Questions 1-3 refer to the information below. Read the passage and answer the questions that follow.

A chain of video game shops uses software to manage its supply inventory. The system was recently upgraded. Game Shop managers interacted with the original system using a computer located in the business office. Managers interact with the upgraded system using a special tablet. The upgraded system (but not the original system) stores all information from the tablet in a database for future reference. This includes the manager's time of data entry and items checked. The original system and the upgraded system are described in the following flowcharts. Each flowchart uses the following blocks:

Block	Evaluation
Oval	The start of the algorithm
Parallelogram	An input or output step
Diamond	A conditional or decision step, where execution proceeds to the side labeled "Yes" if the answer to the question is yes and to the side labeled "No" if the answer to the question is no.
Rectangle	The result of the algorithm.

Original System

Upgraded System

1. The upgraded system uses a menu of categories containing additional information not supplied by the original system. The menu is used to help order items more efficiently, saving each of the video game shops money. Which of the following is **least** likely to be included in the menu of categories?
    a. A category for customer service feedback.
    b. A category listing commonly ordered items.
    c. A category for each location in the video game shop.
    d. A category for emergency or rush orders.

2. Of the following potential benefits, which is **least** likely to be provided by the upgraded system?
    a. Some items may be placed on automatic reorder.
    b. One single list of supplies for order.
    c. The manager will be able to order more efficiently.
    d. The manager will be unable to mistakenly select the incorrect item they are trying to order.

3. Which of the following is most likely a data privacy concern of the upgraded system?
   a. The manager's ordering credentials could be compromised if an unauthorized individual gains access to the ordering system.
   b. Storing information in the ordering system makes it easy for individuals to trick the system using malicious links.
   c. The system design increases the chance that managers will unknowingly install malware on the tablet or devices that will share their credentials with unauthorized individuals.
   d. The system design makes it easy for unauthorized individuals to acquire managers' private encryption keys.

Questions 4-8 refer to the reading passage below. (based on an article from The Guardian)

SpeechAlt is a real-time voice-altering AI software that changes the speaker's accent and tone to make them sound like a westerner. Using data about the sounds of different accents and how they correspond to each other, the AI engine transforms a speaker's accent. The software is downloaded into the phone and users have the option to turn the system on or off. This software is primarily used by customer service representatives in countries such as India or the Philippines to mask their accent and sound like a Westerner.

The software stores phone conversations for quality checks and for AI training data. Prior to using this software, representatives at the call center had to go through months of training to mask their accent.

4. Which of the following is considered a potential effect of the application rather than a function of the application?
   a. SpeechAlt changes the speaker's accent and tone to make them sound like a westerner.
   b. SpeechAlt provides a shortcut for call center representatives from having to train for months to sound like a westerner.
   c. The computing innovation leaves out the bias of the caller against minority call center representatives and focuses on the problem that needs to be solved during the call.
   d. The computing innovation uses data about the sounds of different accents to transform a speaker's accent.

5. Which of the following is most likely to be a benefit of storing the phone conversations?
   a. Making improvements to the software.
   b. Keeping track of topics customers call about.
   c. Quality control at the call center.
   d. Keeping count of resolved tickets.

6. Which of the following may be an unintended effect of the use of SpeechAlt?
    a. Customers calling the call center cannot distinguish the nationality of the call center representative.
    b. The call center representative's voice sounds robotic.
    c. Call center representatives can focus on resolving issues the users call about.
    d. The computing innovation caters to user's racist beliefs that a non-westerner is incapable of resolving issues.

7. Which of the following data is not provided directly from the user but is necessary for SpeechAlt to operate as intended?
    a. Sound bites from people residing in different countries of the world.
    b. A list of frequent issues users call about.
    c. The email address of the caller.
    d. Location of the caller.

8. Which of the following groups is least likely to receive targeted advertisements by businesses that are affiliates of SpeechAlt?
    a. A university student with a speech impediment.
    b. A news reporter in the United States.
    c. Teenagers who want to prank their friends on the phone.
    d. A Korean student who wants to learn English.

Reflections

Now that we have reviewed this content **you** (the student that will take the exam) should ask yourself how well you understand this aspect of computer science. Based on your level of understanding you should determine **your** next steps.

Note that NMSI has made available a Topic Eleven Asynchronous Module that further reviews this topic. The module includes practice problems, instructional videos and other review material. Please ask your facilitator for more information about this resource.

Take about 60 seconds to reflect on this content.

1. Give yourself a ranking of 1 to 5 stars in terms of how well you understand what we just reviewed, 1 star being "I'm so lost" and 5 stars being "I could teach this to my parents."

1	2	3	4	5

2. Identify three next steps that you will take to improve your knowledge of this content before the exam.

3. We will either "sound off" and verbally share our reflections or post them in the chat (your facilitator will decide).