Explore PT Survival Guide[1]

Explore PT Overview

Goal of the Task: Explore through research, then explain and represent the impact, function, and societal effects of a computing innovation.

What you Submit: (1) Computational Artifact (2) Written Responses to prompts 2a-e (with citations of sources for where you found the information).

How you get a good score: The AP committee wants to see that you can:

- identify a computing innovation
- demonstrate a basic understanding of how it works
- discuss the positive and negative effects this computing innovation on society
- cite those things with articles or other texts you found doing research.

Suggested Process in a Nutshell (see also: Sample Timeline on following pages)**:**

1. **Pick a good innovation…**
   - Make a list of potential computing innovations to use for the task (see below)
   - Do some "rapid research" to see if you can quickly figure out if its a good one to use for the task (criteria below)
   - Pick an innovation that works well and start the task!

2. **Do rapid research to find your answers for written prompts...**
   - Beneficial and harmful effects of the innovation on society, economy, culture (prompt 2c)
   - How it consumes, produces, or transforms data (prompt 2d)
   - Data storage, privacy, or security concern (prompt 2d)

3. **Make your computational artifact**
   - Make something that represents your responses to 2a and 2d

4. **Finalize written responses and submit!**

Picking a good Computing Innovation

Make your life easier: Choosing a good computing innovation from the outset will make completing the task easy. Choosing something that you're interested in and motivated to learn more about will also help. Do this by ensuring two things *before* you fully commit:

(1) You have identified an *actual* computing innovation
(2) You have a good idea of how to respond to the written responses about your innovation.

Evaluate Computing Innovations by asking these questions:

1. Does it use data? (input, transform, output)	**2. Can I identify a group it impacts?** (both positively and negatively)	**3. Can I find published references about it?**

If you can answer "yes" to these three questions you've likely identified a true computing innovation that will work well for the task. **Remember**: if the innovation is not a true computing innovation, you can only earn 1 point for the ENTIRE task. CHOOSE YOUR INNOVATION WISELY!

[1] *Much of the content of this this guide was borrowed and/or modified with permission from Jill Westerlund at the Abstracting CS blog. We are grateful for Jill's ingenuity and generosity.*

Computing Innovation Brainstorm Activity (10 mins)

- Place a √ next to at least 3 innovations you think are *definitely* a good choice for the explore PT
- Place a **X** next to at least 3 that are *definitely NOT* a good choice for the Explore PT
- Start to jot down your own ideas for Computing Innovations you might want to use for the Explore PT

√ / X	**"Innovations" / topics**	***Your Ideas for computing innovations to use for the Explore PT*** *Note: you can use one of, or some aspect of, the items in the list for your own task.*
	Self-driving car	
	Fiber-optic cable	
	TCP Protocol	
	Smart watch	
	Music Recommendation App (e.g. Pandora)	
	Bluetooth speakers	
	Digital clock	
	Backup camera on a car	
	Facial recognition software	
	Email	
	Laptop computer	
	A system for digitizing and sharing medical records	
	Wireless phone charging	
	Instagram	
	Police body cameras	
	3D Printer	
	Bitcoin	
	Google glasses	
	Snap Chat	
	GPS	
	A phone app	
	Video streaming service (e.g. Netflix)	

After you've finished, compare your list with a friend and discuss.

Notes:

- Many innovations you've studied or read about in this class are not good choices.
- Assume you'll need to do quick research on a few ideas before you land on an actual topic for this task.
- A common pitfall is to choose a technological innovation without identifying the computational aspect of it. For example: a self-driving car is a technological innovation. But a good choice for the performance task is to identify a particular aspect of a self-driving car that clearly involves computing.
- Hardware is often a gotcha - make sure you can identify the computing part.

Brainstorm: harmful effects v. data security concerns (10 mins)

One of the challenging things about the Explore PT in doing research is distinguishing between a harmful effect and a data security/privacy concern. Computing innovations can lead to “bad stuff” happening but how do you know if it’s a harmful effect or data storage, privacy, security concern? Here’s how to think about it for the Explore PT:

Harmful effects on society, economy, culture

Translation: *what are the unintended consequences of this innovation on specific groups of people assuming the innovation works as intended? For harmful effect: who or what stands to lose from wide use of this innovation now, or in the future?*

V.

Data storage, privacy, or security concern

Translation**:** *What are the risks? How could the data be misused? What are the security or privacy risks?*

Activity: Here’s a list of “bad stuff” resulting from computing innovations. Identify which is a harmful effect and which is a data storage/security/privacy concern (following the Explore PT definitions).

“Bad stuff” from computing	Harm	Data
Autonomous cars must constantly collect and store data about their location. Hacking this information could allow attackers to remotely track where drivers travel.		
Autonomous cars will displace thousands or even millions of people currently employed as bus, taxi, and truck drivers.		
Digitizing and moving medical records online makes it significantly easier for attackers to access personal information about almost anyone in the country / world.		
Music recommendation systems may inadvertently direct listeners towards a more narrow selection of music, decreasing the diversity of our cultural output and consumption.		
The growing use of facial recognition software makes it increasingly challenging to navigate society anonymously.		
Online advertising is so individualized that we can now operate within our own “filter bubbles”. For example political discussion suffers as it becomes challenging to communicate based on a set of shared experiences or pieces of information.		
Data about things that you have "Liked" online can be used to make reasonable guesses about your age, gender, location, and many other pieces of personal information.		
Car sharing apps like Uber or Lyft have contributed to a class of workers who may work full time but do not enjoy the typical social and economic benefits typically associated with full time work.		
Your location history in a mapping app can allow someone to know where you live, go to school, or spend time.		

After you’ve finished, compare and discuss with a partner.

Rapid Research Activity - Harmful Effects (15 mins)

Now that you have a sense of what a harmful effect is you will practice doing some rapid research to see if you can quickly identify a harmful effect for some innovation. Remember that for the harmful effect you should:

- Assume the innovation is being used or works as intended
- Identify the impact on society, economy or culture
- Identify a specific group of people who are impacted

Research Tips: Since you need to identify harmful effects to specific elements of society and people, you might kick off your research by searching for things like:

- "The unintended consequences of ____"
- "pros and cons of ____"
- "the downsides of ____"
- "____ economic impacts"

<table>
<tr><th colspan="3">Rapid Research: Harmful Effects</th></tr>
<tr><td colspan="3">Pick one of the computing innovations from the Computing Innovation Brainstorm Activity (either from the list or one that you wrote down) and see how quickly you can find a harmful effect that will work for the Explore PT. Fill in the table below with what you found</td></tr>
<tr><td colspan="3">Computing Innovation:</td></tr>
<tr><td>Harmful Effects I found:</td><td colspan="2">Group of people of people affected:</td></tr>
<tr><td colspan="3">Is this primarily an impact on… ☐ Society ☐ Economy ☐ Culture</td></tr>
<tr><td>Search Terms I used:</td><td colspan="2">Sites / Articles I found:</td></tr>
</table>

Notes on groups of people, society, economy, culture:

- **culture** - can be thought of as a group of people: example – football players are a culture, students that have asthma are a culture
- **economy** - can be thought of as a group of people with similar economic interests, or whose jobs or or industry are similar. Example: (Netflix put companies like Blockbuster and rental places out of business)
- **society** - try to avoid "society". It's too broad. Get specific: Which society? Whose society?

Explore PT Planning Organizer

Innovation Name:

Facts about purpose and function:

*Response **2a***
*Row **2***

Artifact Planning Ideas:

Computational Artifact
*Row **1***

How does the artifact illustrate represent OR explain the innovation's purpose, function or effect?

Explain one effect of the innovation.

*Response **2c***
*Row **3***

Explain one beneficial effect (and the group affected, provide source)

*Response **2c***
*Row **4, 5***

Explain one harmful effect. (and the group affected, provide source)

*Response **2c***
*Row **4, 5***

Description of data used by innovation (specific type; describe how below)

*Response **2d***
*Row **6***

Input (consume)

*Row **6***

Process (transform)

*Row **6***

Output (produce)

*Row **6***

Explain one data storage, privacy or security concern from misuse of innovation and/or its data

*Response **2d***
*Row **7***

References:

1)

2)

3)

*Response **2e***
*Row **8***

Explore PT Completion Timeline

Before you start, you should think about how you are going to allocate your time for the 8 hours provided for the task. Below is a sample timeline that you can use to plan out how you will complete the Explore Performance Task.

Hour	Suggested Activity	Your Plan
1	Brainstorm ideas for computing innovations ● Do rapid research to decide what to do ● Use the Explore PT Planning Organizer **Goal:** By the end of this day you should know what your innovation is and most of the sources you will cite	
2	Research and draft responses for prompts 2c, 2d: ● Use the Explore PT Organizer ● **2c** - Beneficial and Harmful Effects ● **2d -** How it uses data + security concern	
3	Continue work from Day 2 **Goal:** Finish responses **2c** and **2d**	
4	Create the computational artifact ● Use the PT Organizer to sketch an idea ● **Goal:** know what you're going to make for artifact and start it.	
5	● Continue work on computational artifact ● Draft response to **2a** - Intended purpose or function of innovation.	
6	Continue Comp. Artifact + **2a** **Goal:** Finish Comp. Artifact and response **2a**	
7	Review, clean up, touch up ● Complete **2e** - References ● Complete Response **2b** ● Make sure you have source cited for any fact or claim in **2a, 2c, 2d**	
8	Complete the task ● Review the submission materials ● Check your responses against the scoring guidelines ● Enter your responses into the digital portfolio ● Upload your computational artifact (and/or PDF of written responses to the the digital portfolio) **Goal:** At the end of this day, your Explore PT is submitted!	

Note: The timeline above is just a guideline. You may complete the performance task on a different schedule. Make sure to leave enough time to complete your computational artifact and write-up.

Written Response Templates

Prompt 2a. Provide information on your computing innovation and computational artifact.

- Name the computing innovation that is represented by your computational artifact.
- Describe the computing innovation's intended purpose and function.
- Describe how your computational artifact illustrates, represents, or explains the computing innovation's intended purpose, its function, or its effect.

(Must not exceed 100 words)

Advice: This prompt requires you to state multiple pieces of information in only 100 words. Keep each section short and consider using a bulleted list.

Purpose and function are not the same. The purpose is the goal or objective that the innovation is designed to accomplish. The function is how the innovation accomplishes the purpose. The function is the actual "computing" done by the innovation, as in how it consumes, produces, or transforms data, to accomplish the purpose. Features of an innovation alone like "faster speeds" or "bigger screens" often do not fit well in either category.

Your computational artifact should should speak to and clarify the purpose or function of the innovation in some way, preferably with diagrams, images, or in other primarily non-textual ways. This written response should explain HOW your computational artifact goes about this.

You should cite references used for these responses, in particular the purpose and function of your innovation which were likely important parts of your research.

Potential Research Terms

- "How it works: _____"
- "The science behind _____"
- "The history of _____"
- "How does _____ work?"

Draft Your Response Here:

Name of innovation:
Purpose:
Function:
Computational Artifact Purpose:

(must not exceed 100 words)

2a. Response Checklist

- ❏ Name of Computing Innovation
- ❏ The purpose of innovation - the intended goal or objective of the innovation
- ❏ The function of innovation - how the innovation works (for example, consumes and produces data)
- ❏ How artifact describes purpose, function and / or effect of the innovation
- ❏ Not exceed 100 words
- ❏ Cite any references used

2b. Describe your development process, explicitly identifying the computing tools and techniques you used to create your artifact. Your description must be detailed enough so that a person unfamiliar with the tools and techniques will understand your process
(Must not exceed 100 words)

Advice: NOTE: This response is not scored, but you can use this section to cite any sources used in the creation of your computational artifact.

- All images, diagrams, or information that appears in your computational artifact and that you yourself did not make should appear both in your citations and within this response.
- Also, by briefly describing the tool used to make the artifact and how you went about it can further help verify that you are the author of your artifact and did not merely submit someone else's work.

Draft Your Response Here:

Tool Used:
Quick Summary of Process:
Cite Sources in Computational Artifact:

(must not exceed 100 words)

2b. Response Checklist

- ❏ Describe the tool you used
- ❏ Describe the development process
- ❏ Mention if it's a new artifact or combining artifacts
- ❏ Cite sources for artifacts used
- ❏ Must not exceed 100 words

2c. Explain at least one beneficial and one harmful effect the computing innovation has had, or has the potential to have, on society, economy, or culture.
(Must not exceed 250 words)

Advice: Usually the beneficial effect is easy to identify - it's often the reason the innovation was created in the first place. A "harmful effect" should be an *unintended consequence* of the innovation being used the *way it was intended*. Focus on how the innovation, even when used correctly, will negatively impact some group of people, either culturally or economically. And cite sources to back up these claims.

Understand and focus on society/economy/culture (think about a group of people who may be impacted):

- **culture** - can be thought of as a group of people: example – football players are a culture, students that have asthma are a culture
- **economy** - can be thought of as a group of people with similar economic interests, or whose jobs or or industry are similar. Example: (Netflix put companies like Blockbuster and rental places out of business)
- **society** - try to avoid saying "impacts to society...". It's too broad. Get specific: Which society? Whose society?

Data security and privacy concerns are NOT "harmful effects" by this definition. The fact that autonomous cars, online banking, or social media can be hacked is NOT an example of a harmful effect since these are examples of the innovations being used differently than they were intended.

You also must explicitly use the terms "beneficial" and "harmful" (or words close to those) in your response. Do not make the grader guess - just directly state the benefits and harms and the groups affected. You must explicitly tie each effect to a group of people and say what the effect is on society, economy, or culture.

Research Tip: Since you need to identify the beneficial and harmful effects to specific elements of society and people, you might kick off your research by searching for things like:

- "The unintended consequences of ____"
- "pros and cons of ____"
- "the downsides of ____"
- "____ economic impacts"
- "The ethics of _____"
- "Legal concerns about _____"

NOTE: you may find articles with these searches that are also a fit for security concerns below.

Draft Your Response Here:

Beneficial Effect:
Who's Impacted:
Society / Economy / Culture and How:

Harmful Effect:
Who's Impacted:
Society / Economy / Culture and How:

(must not exceed 250 words)

2c. Response Checklist

- ❏ Use maximum of 250 words. (Try 2 paragraphs: 1 for the beneficial and 1 for the harmful effect)
- ❏ Clearly stated one beneficial effect AND one harmful effect
  - ❏ Why it is a beneficial or harmful effect
  - ❏ Who (the group) benefiting or being harmed
- ❏ Is the harm *really* a data security/privacy/concern? If so, rethink.
- ❏ DO NOT USE THESE for harmful or beneficial effects: (1) Hacking (2) Cost (3) Your personal opinion
- ❏ Cite your sources for where you found the beneficial and harmful effects.

2d. Using specific details, describe:

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

(Must not exceed 250 words)

Advice: If you have identified an actual computing innovation, then it's using data somehow — you just need to describe it. Think: what is actually being computed here? Think about or find through research: at the deepest level, what is the actual data (the actual numbers) that the innovation uses to do its thing? Don't just say what data is collected or how it's collected, but describe how it *uses* the data and *what it does with the data,* what it *computes* to achieve some effect. Your response should allow a reader to fill in the blanks: *it takes this* ____ *data, and does* _____ *to produce* ____.

Avoid describing the *device* that captures data. A camera is not data. A digital image is. You don't necessarily need to know the format of the data.

For a data security concern, think: what could happen if this data fell into the wrong hands, or were used for something besides the intended use. Could individuals be identified without their knowing it? Could someone or some organization in possession of all this data do something bad with it?

Research Tips

For how it uses data try searching:

- "How it works: _____"
- "How does ____ work"
- "The science behind _____"

For security concerns try searching:

- "____ and your privacy (or security)"
- "Risks of using _____"

Draft Your Response Here:

The data the innovation uses:
How/what does it "compute" (something like: it takes this ____ data, does this _____ to produce _____)"
A security/privacy/storage concern is:

(must not exceed 250 words)

2d. Response Checklist

- ❏ Describe the data the innovation uses (make sure that the data used by the innovation is actually digital / numeric)
- ❏ Describe how the innovation "computes" in terms of the data it uses.
- ❏ Describe one data security, data privacy, or data storage concern
- ❏ Cite a source for where you found info about (1) how it works (2) security concern
- ❏ 250 word limit

Computational Artifact
Your computational artifact must provide an illustration, representation, or explanation of the computing innovation's intended purpose, its function, or its effect. The computational artifact must not simply repeat the information supplied in the written responses and should be primarily nontextual. Submit a video, audio, or PDF file.

Use computing tools and techniques to create one original computational artifact (a visualization, a graphic, a video, a program, or an audio recording). **Acceptable multimedia file types include .mp3, .mp4, .wmv, .avi, .mov, .wav, .aif, or .pdf format. PDF files must not exceed three pages. Video or audio files must not exceed 1 minute in length and must not exceed 30MB in size.**

Advice: The reality is that the computational artifact is a media artifact that you make on a computer that helps communicate information about what the innovation is and how it works. It doesn't need to be a static image/graphic but that's certainly the easiest and fastest thing to create and you need to consider time for this task. Try to capture the purpose *and* the functionality with whatever you create. At the very least, you should demonstrate what the innovation is or does, but you should be aiming to clarify the purpose and function of your innovation. You want to make something you can point to for your selected innovation, and say: *here is what it is, here is what it does, and here is how it works.*

Definition of Computational Artifact from the scoring guidelines: *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 strong artifact will represent your written responses to 2a and 2d.

- In **2a** you describe the innovation's purpose - think: how can I represent that visually? (or with audio, video, etc.)
- In **2d** you describing how the innovation uses data, which is *really* describing its function - think: how can I represent that visually (or with audio, or video, etc.)
- After you make your artifact you can refer to it from your responses to 2a and 2d if that would help strengthen your explanation.

A few different types of artifacts

- Create a simple diagram, infographic, or flowchart that clarifies the way your innovation works
- Make a simple chart of information about your innovation
- Find (and cite) images of your innovation being used in a variety of contexts
- Make an animation or video using screen capture that demonstrates the purpose and function of the innovation
- Make a 3-slide (3 page) presentation that you either capture on screen, or submit as PDF
- Make a 1-minute "podcast" about your innovation.

Computational Artifact Checklist:

- ❏ Name of innovation appears in the artifact
- ❏ Shows the purpose of the innovation
- ❏ Shows the function of the innovation
- ❏ Primarily non-textual (Labels on a diagram: ok. A slide with bullet list of text: not ok).
- ❏ Uses an acceptable file type. One of: .mp3, mp4, .wmv, .avi, .mov, .wav, .avi, .aif, or .pdf format.
  - ❏ PDF files must not exceed **3 pages** -- **Video** or audio files must not exceed **1 minute** in length
  - ❏ File is less than 30 Megabytes

Tips on software

- ❏ If at all possible, stay away from a .wav file for audio because they tend to be larger files.
- ❏ Also stay away from .aif files because they often aren't readable on PC's without specific paid plugins.

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

- At least two of the sources must have been created after the end of the previous academic year.
- For each online source, include the complete and permanent URL. Identify the author, title, source, the date you retrieved the source, and, if possible, the date the reference was written or posted.
- For each print source, include the author, title of excerpt/article and magazine or book, page number(s), publisher, and date of publication.
- If you include an interview source, include the name of the person you interviewed, the date on which the interview occurred, and the person's position in the field.
- Include in-text citations for the sources you used.
- Each source must be relevant, credible, and easily accessed.

Advice: It's most likely you're doing research on the web and you'll need to cite a bunch of websites as your sources. You can use any citation format you like, or prefer (especially if your teacher has a particular preferred style). We recommend listing citations as a numbered list with a standard MLA format that includes the website URL (see below for template in: *Draft Your Response Here*)

There are a number of websites out there that will generate citations for you, but just make sure they're actually including all the info you need. If you need to cite or print other sources, generally the format is roughly the same but you should look up a good way to do it. Here is a decent guide http://www.bibme.org/mla The task requires a minimum of 3 sources, but it shouldn't be hard to include more.

Make sure that after you created your numbered citation list, that you go back into your written responses and add the correct number at the end of a sentence or paragraph to indicate the source of the information. **You should cite any fact or claim** that you make in written responses. You may use the same source for some of these but there are roughly at least 6 claims you need to make *plus* anything included in your computational artifact:

1. Purpose of the innovation
2. Function of the innovation
3. Beneficial effect (including group affected)
4. Harmful effect (including group affected)
5. How it uses data
6. Data security/privacy concern
7. Computational artifact sources

Wherever you state your claim in the written response you should have a citation at the end of the sentence or paragraph. Something like:

> *This innovation has a potentially harmful economic impact for workers in the _____ industry because it encourages consumers to ____ rather than _____* ***[5]***

Draft Your Response Here (MLA format sampled below):

[1] Author's Last name, First name. "Title of Web Page." Title of Website, Publisher, Date published, URL. Date retrieved.

[2] Author's Last name, First name. "Title of Web Page." Title of Website, Publisher, Date published, URL. Date retrieved.

[3] Author's Last name, First name. "Title of Web Page." Title of Website, Publisher, Date published, URL. Date retrieved.
...

(no word or character limit)

2e. Response Checklist

- ❏ You have at least 3 sources cited
- ❏ You've cited the source for *any* image or other element you used in your computational artifact (and list which ones in response 2b).
- ❏ You've included references to your sources from *within* the text of the written responses 2a-d where appropriate.