AP Computer Science Principles Summer Tasks

Welcome to AP Computer Science Principles! This presentation outlines the summer tasks you need to complete before the start of the school year. There are five main tasks: reading course tips and expectations, completing the honor code email assignment, creating a Scratch account and completing tutorials, watching a movie and writing a paper, reading chapters from "Blown to Bits," and playing games to understand conditional statements.

by Susan O'Neil

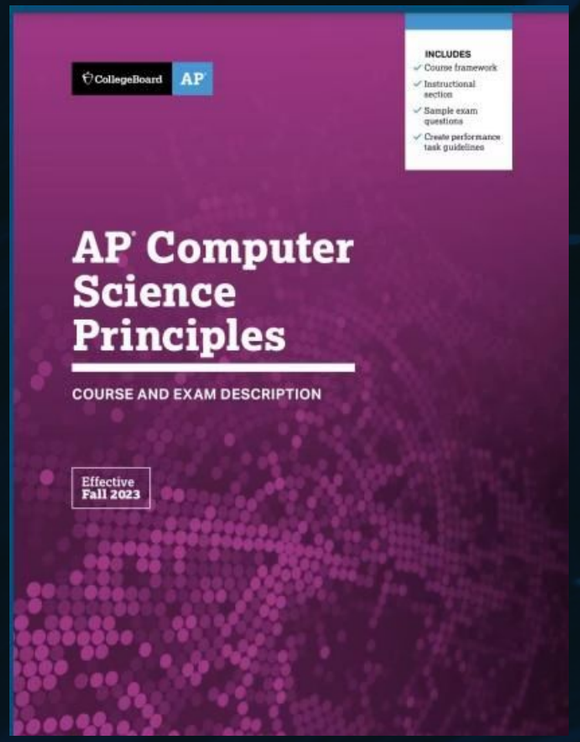
Tips and Expectations

Be Proactive

Read the material before we discuss it in class, and demonstrate your curiosity and engagement regularly during class discussions.

Check Communications

Check your school email regularly, and make it a habit to check for grades, assignments, and supplemental material.



Attend Extra Help

By clarifying any issues you have early on, you can avoid catastrophe as the material and concepts accumulate.

Master Early Material

It is imperative that you have a handle on early material, as it is the foundation for the rest of the course.

Embrace Creativity

Embrace mathematics, logic, and CREATIVITY!

Understand d Failure

Coding takes time and patience - Learn from the mistakes

Honor Code

Academic Integrity

Students of Xavier College Preparatory High School, pledge to uphold the highest standards of academic integrity and honesty. I recognize that plagiarism and other forms of academic misconduct undermine the fundamental principles of scholarship and personal responsibility that are central to our educational mission.

Prohibited Actions

I will not engage in plagiarism, which includes presenting someone else's work as our own, submitting work copied from a source without proper attribution when allowed, or submitting work created in collaboration with others without acknowledgment.

I will not use AI language models, to generate code or other academic work, except where explicitly allowed by the instructor.

Personal Responsibility

I will take responsibility for ensuring that our work is original, and we will report any suspected cases of academic misconduct to the appropriate authorities.

I will not allow classmates to copy my code or answers and I understand that collaboration does not mean copying. I understand that posting any solution code online is considered a violation of academic integrity.

Task 1: First Email - Introduction and Honor Code

Compose Professional Email

Send an email FROM: your school email address to Mrs. O'Neil: soneil@xavierprep.org

Subject Line: APCSA 24-25 Honor Code

Include Personal Information

Your full name

The name you want to be called in class

Your interests related to computers and programming

Your interests NOT related to computer programming

Answer Key Questions

Why did you decide to take this course?

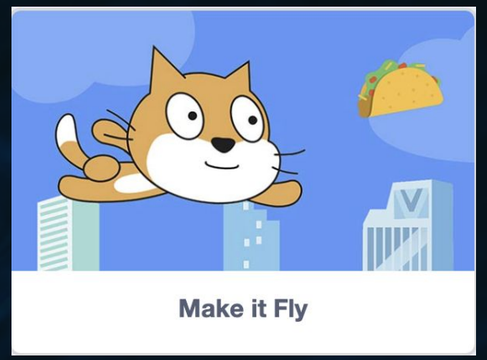
What is your biggest fear about taking a computer science course, if any?

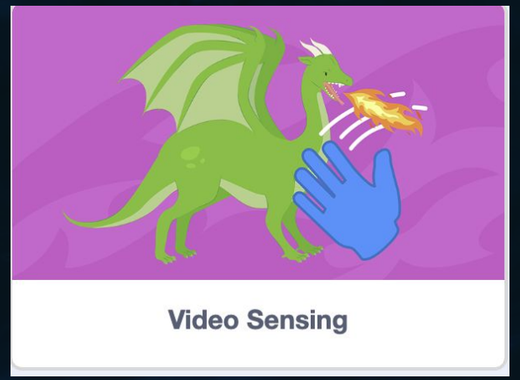
Acknowledge Honor Code

State that you have read the honor code policy and that you will comply with the policy while taking this class

Include proper closing with your name, "APCSP Student", school name, and graduation year

Task 2: Scratch Tutorials





Create a Scratch Account

Make a scratch account and email your username to Mrs. O'Neil. Remember that usernames must not reveal the identity of students in any way. No real names . Email me your chosen user name.

SCRATCH ACCOUNT

Complete these Tutorials

Complete the above Scratch tutorials

Share Your Work

Share your completed projects in the Scratch studio.

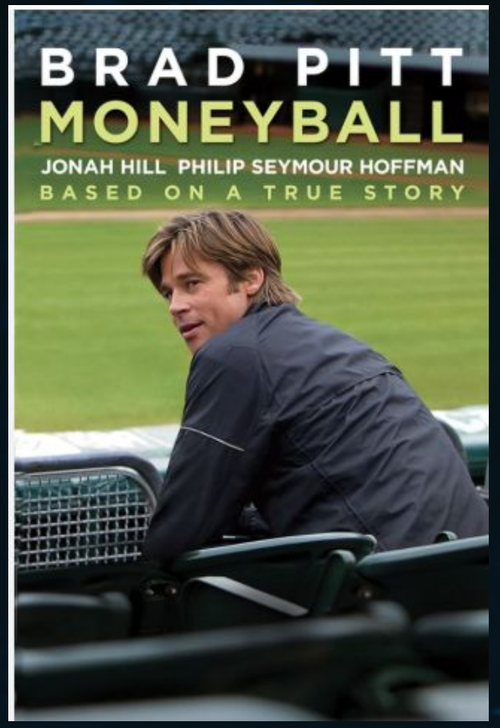
Task 3: Movie Assignment

Minority Report

Explore computer vision, predictive algorithms, and cybersecurity aspects depicted in the film.

The Martian

Analyze computer programming, problem-solving, life-support systems, and interplanetary communication challenges.



Moneyball

Discuss data-driven decision-making, computer algorithms for player analysis, and data visualization techniques.

Watch one of the movies (Minority Report, The Martian, Moneyball, Tron, or The Internship) and write a one-page paper answering two of the three prompts for your chosen movie. Read the prompts first before deciding which movie to watch. Remember to follow the honor code - write your own responses as AI detectors will be used.

Task 3: Movie Assignment

Tron

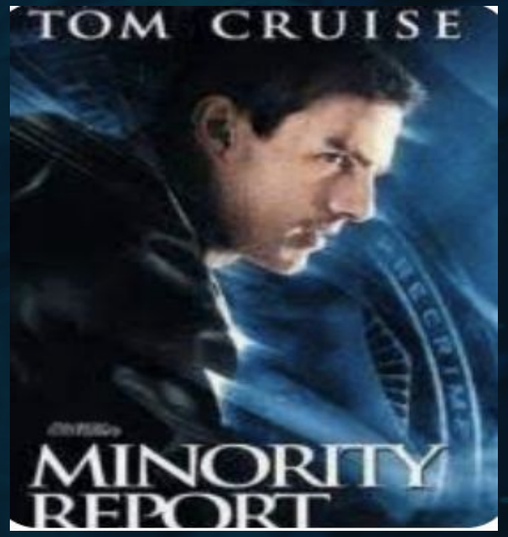
Analyze the groundbreaking visualization of computer concepts, portraying programs as sentient entities, depicting virtual environments as physical spaces.

The Internship

Discuss how collaboration and critical thinking play into creating a good team and why they are important in computer science.

Watch one of the movies (Minority Report, The Martian, Moneyball, Tron, or The Internship) and write a one-page paper answering two of the three prompts for your chosen movie. Read the prompts first before deciding which movie to watch. Remember to follow the honor code - write your own responses as AI detectors will be used.

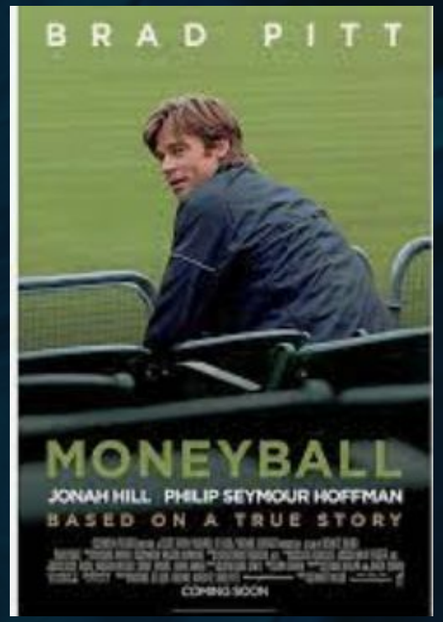
Minority Report



- Discuss the role of computer vision in the movie "Minority Report." How does the PreCrime system utilize computer science techniques to predict and prevent crimes? Discuss the use of facial recognition, image analysis, and pattern recognition in the film.
- The concept of predictive algorithms plays a crucial role in the plot. Analyze how computer science principles, such as machine learning and **data mining (look this term up we will be learning about it later in the class),** are used to anticipate criminal behavior. Discuss the ethical implications and potential limitations of relying solely on algorithmic predictions.
- During the movie we see the manipulation and alteration of digital information Discuss the cybersecurity aspects depicted in the film, focusing on hacking, data manipulation, and the challenges of securing sensitive information in a highly advanced technological society.

The Martian

- In order to survive, the main character has to rely on critical thinking and computer science skills. How is computer programming and problem-solving portrayed in the movie. Discuss the role of coding, algorithms, and simulation models in overcoming challenges and finding innovative solutions in a hostile environment.
- Research the role of computer science in the design and operation of life-support systems, communication devices, and robotic exploration tools depicted in the film. Discuss the importance of software engineering and hardware integration in space exploration.
- The movie portrays the challenges of interplanetary communication and coordination between the stranded astronaut and mission control on Earth. Research networks and protocols, as these will be discussed later in the course. Discuss the potential limitations and risks associated with communication delays in space missions.



Moneyball

- The main character uses data-driven decision-making in his job as the general manager of the Oakland Athletics. Discuss how computer science techniques, such as statistical analysis and data mining, are employed to identify undervalued players and gain a competitive advantage.
- Computer algorithms are used to analyze player performance and construct a winning team on a limited budget. Discuss the role of machine learning and predictive modeling(look this term up we will be learning about it later in the class) in player selection and team management. How does computer science help optimize player performance and maximize team efficiency?
- The use of data visualization (the graphical representation of information and data. to convey complex information - graphs and charts) is used to show team management how things would work. Discuss how computer science techniques are used to present data effectively in the movie. What impact does data visualization have on understanding and interpreting baseball statistics?

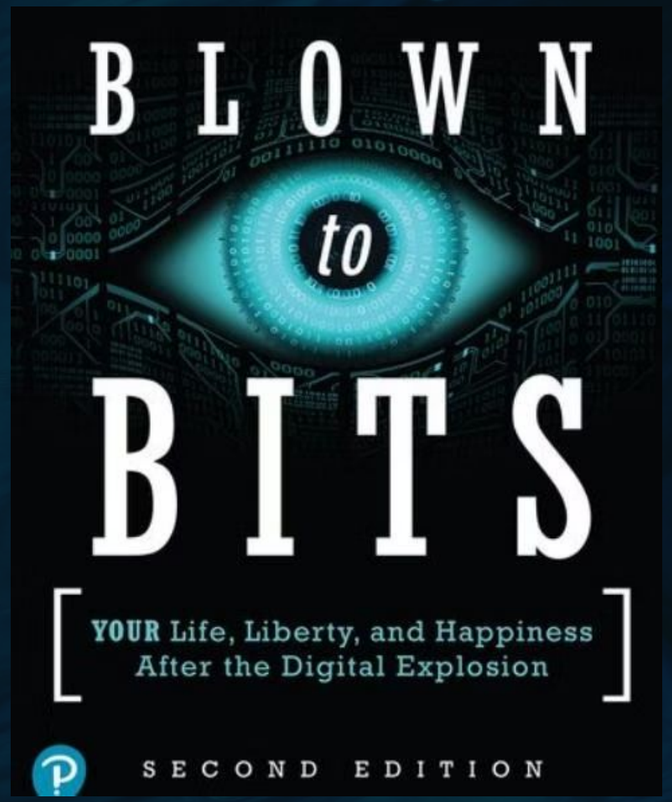
TRON

- The main character is transported into a digital world where computer programs come to life. Explore the portrayal of computer science concepts, such as artificial intelligence, virtual reality, and computer graphics, in the movie. Discuss how these elements contribute to the storyline and how a digital realm might actually look.
- A computer virus is shown as a malevolent entity within the digital world. Discuss the parallels between real computer viruses and the representation of computer viruses in the movie. How does the movie highlight the importance of cybersecurity and the potential risks associated with malicious software?
- Research how computer science techniques, such as computer graphics rendering, 3D modeling, and animation, were utilized to create the distinctive neon-lit world of Tron. Discuss the advancements in computer graphics technology since the release of the movie and their impact on the film industry.

The Internship

- Discuss the role of computer science in the movie by describing how programming languages, algorithms, and data structures are showcased or referenced. How does computer science knowledge contribute to solving challenges and competing in the internship program?
- The characters use various Google products and services, such as Google Search, Google Maps, and Google Docs. Discuss how these technologies leverage computer science principles, such as search algorithms, geolocation, and collaborative document editing. How do these applications demonstrate the integration of computer science into everyday life?
- Collaboration and teamwork are a key component to success in the movie. Discuss the significance of computer science in fostering effective collaboration among the characters. How do tools like version control systems, online collaboration platforms, and project management software enhance teamwork and productivity in a tech-focused environment?

Task 4: Blown to Bits Reading



Reading Assignment

Read Chapters 1 and 2 (72 pages) of "Blown to Bits: Your Life, Liberty, and Happiness After the Digital Explosion"

Take detailed notes as you read - there will be a short quiz on this material during the first week of school.

You are allowed one page (front and back) of notes for this quiz.

If you intend to use notes for the quiz, you must upload them beforehand. If notes are not uploaded, you will not be able to use them during the quiz.

Make sure to use the link provided in the original materials to ensure you're reading the correct version of the book.

Task 5: Understanding Conditional Statements

[80's Arcade Games]

https://worldsbiggestpacman.com/

Using the scaffolding on the next few

Play Arcade Games

Visit https://worldsbiggestpacman.com/ or other arcade games

Identify Conditionals

Look for if-else statements in game mechanics

Prepare for Discussion

We will be discussing these in class in August

Document Rules

Fill in 6 rules you find when playing the game

Pacman

if - else simple example :
YOU MAY NOT USE THIS EXAMPLE

```
if Ghost touches Pacman :
    Pacman dies and you lose a life
else:
    Pacman lives
```

if - else advanced example :

```
lives = 3
while lives > 0:
        play_game()
        if touch_ghost():
            lives = lives - 1
```

if _____:

_____

else:

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if _____:

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else:

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if _____:

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else:

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if _____:

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if _____:

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else:

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