

**AP[®] COMPUTER SCIENCE PRINCIPLES
SCORING COMMENTARY: 2017 STUDENT SAMPLES
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Create Performance Task

Sample: A

Row 1: 1

Row 2: 0

Row 3: 1

Row 4: 1

Row 5: 1

Row 6: 1

Row 7: 1

Row 8: 1

Developing a Program with a Purpose — Row 1

The response earned the point for this row.

The video demonstrates how to log in, review, and add entries to the personal diary. The response indicates that keeping a personal diary is the purpose of this program.

Developing a Program with a Purpose — Row 2

The response did not earn the point for this row.

The response only describes the development at two specific points in time.

Developing a Program with a Purpose — Row 3

The response earned the point for this row.

The response describes what two difficulties were and explains how each was resolved.

The first difficulty is that when including a third Firebase database, the program could no longer be packaged or loaded onto a device for testing. This is resolved by deleting portions of the code until the app worked, and then adding back in the deleted portions.

The second difficulty is transferring variables across screens. This is resolved by using the visible property of these arrangements to make them appear and disappear, providing the illusions of multiple screens.

Applying Algorithms — Row 4

The response earned the point for this row.

The selected code segment implements an algorithm.

Applying Algorithms — Row 5

The response earned the point for this row.

The selected code uses Boolean conditions as a logical concept.

The response explains how the algorithm functions by stating it “examines the tag and values sent back in order to properly redirect the program to either proceed with a login or create account procedure”.

The response describes what the algorithm does in relation to the overall purpose of the program (store user data).

Applying Algorithms — Row 6

The response earned the point for this row.

The selected code includes two algorithms (loginProcedure and createAccount procedures) that are integrated to create a new main algorithm (account access).

Both loginProcedure and createAccount use logical concepts.

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The response explains how the loginProcedure procedure functions (“login in the user and load up the user’s diary entries if the correct password is entered. Otherwise, an error message will appear and the user will have to try again.”)

Applying Abstraction — Row 7

The response earned the point for this row.

The abstraction being described is a procedure created by the student.

Applying Abstraction – Row 8

The response earned the point for this row.

The response indicates that the abstraction (procedure loadEntryData) “manages complexity as any future changes that need to be made to loading user entry data can be done in a single place. Overall, this abstraction was helpful in managing redundancy, length of code, edit ability, and overall complexity.”

Sample: B

Row 1: 1

Row 2: 0

Row 3: 1

Row 4: 1

Row 5: 1

Row 6: 1

Row 7: 1

Row 8: 1

Developing a Program with a Purpose — Row 1

The response earned the point for this row.

The video demonstrates continuously running of at least one feature. The response describes the purpose of the program “is to have the user plan placement and attacks to ultimately take over every cell and win the game.”

Developing a Program with a Purpose — Row 2

The response did not earn the point for this row.

The response only describes the development at two specific points in time.

Developing a Program with a Purpose — Row 3

The response earned the point for this row.

The response identifies two difficulties and how they were resolved.

The first difficulty is how to randomly place wasps in cells without overlapping. This was resolved by overlapping wasp placement by placing subsequent wasp placement underneath original wasps.

The second difficulty is determining a winner and replacing the bees/wasps. This difficulty was resolved by a swap algorithm that removed "ownership" of a cell from one opponent and gave it to the other opponent.

Applying Algorithms — Row 4

The response earned the point for this row.

The selected code segment implements an algorithm.

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Applying Algorithms — Row 5

The response earned the point for this row.

The selected algorithm includes logical concepts through the use of if statements.

The response describes how the algorithm functions by stating, “for each wasp-occupied cell, the algorithm checks if any bordering cells are bee-occupied and accordingly adds an appropriate cell to a list.”

The response describes what the algorithm does in relation to the overall purpose by stating that “it assures that the computer will attack from a cell that is possible to attack from.”

Applying Algorithms — Row 6

The response earned the point for this row.

The selected algorithm includes sequential search algorithms. The first “goes through the entire list of wasp-occupied cells.” The second “searches the bordering cells... and checks if any bordering cells are bee-occupied.”

The second algorithm uses logical concepts by using an if statement.

The response explains how the algorithm functions by saying, “If a bee-occupied cell is found to be neighboring the current “h” cell, then the current “h” cell is added to the list. Once the whole list of wasp-occupied cells has been checked, the final list is randomly chosen from to be the computer’s attacking cell.”

Applying Abstraction — Row 7

The response earned a point for this row.

The selected code segment is a student-developed procedure.

Applying Abstraction — Row 8

The response earned a point for this row.

The response indicates the selected abstraction manages complexity “by hiding the long list of coordinates and coding used to execute the tasks.” The response further explains that these blocks contain the 25 lines of code that “keeps the main code clear and easy to debug.”

Sample: C

Row 1: 1

Row 2: 1

Row 3: 1

Row 4: 1

Row 5: 1

Row 6: 0

Row 7: 1

Row 8: 1

Developing a Program with a Purpose — Row 1

The response earned a point for this row.

The video is continuously running and demonstrates two adventures in the adventure game.

The response indicates that the purpose of this program is to create a fun and interactive adventure game.

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Developing a Program with a Purpose — Row 2

The response earned a point for this row.

The response describes the development process to create the entire program. The response states, “I wrote this program, first by creating an identity for the user... and then by creating worlds with mini games within them for the user’s chosen character to complete.”

The response describes how they used an iterative development process by testing the use of the username throughout the game. “To resolve this issue, I changed the username input to a global variable that was able to be called on multiple screens in the program.”

Developing a Program with a Purpose — Row 3

The response earned a point for this row.

The response describes two difficulties that were encountered and how these were resolved.

The first difficulty is with the carrying of inputs to a different screen. This is resolved by using a global variable instead of a local variable.

The second difficulty is the moving of the user's character between screens. This is resolved by using a variable and an if statement to set the image of the user's character throughout the program.

Applying Algorithms — Row 4

The response earned a point for this row.

The selected code segment implements an algorithm.

Applying Algorithms — Row 5

The response earned a point for this row.

The selected algorithms use logical concepts by including if statements.

The response explains how the coin event algorithms functions. The response states, “Each time the coin is clicked, the variable treasureScore increase by 1. Once the score reaches 20, another variable gotCoins, increase by 1 and the screen switches to a win screen with a continue button.

The response describes how this algorithm does in relation to the overall purpose. It states, “Once this task (the coin event game) is complete, the user must play a second mini game in which he/she collects a scale. When both mini games are won, the Underwater Adventure level is complete.”

Applying Algorithms — Row 6

The response did not earn a point for this row.

While three algorithms are shown, there is not an algorithm that is using at least two or more algorithms. The two algorithms independently call on the third.

Applying Abstraction — Row 7

The response earned a point for this row.

The selected code segment includes a student-developed procedure setUpBlastOff. The additional procedures that are shown are used in this procedure.

Applying Abstraction — Row 8

The response earned a point for this row.

The abstraction being described is a procedure setUpBlastOff that calls three additional procedures. The response explains that the abstraction makes the program more manageable “because they take repeated sections of code that would add significant complexity to my algorithms and reduce them into single functions.

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For example, the `setUpBlastOff` function would require at least 12 lines of code each time it was called if it were not condensed into a function.”

Sample: D

Row 1: 1

Row 2: 0

Row 3: 1

Row 4: 1

Row 5: 1

Row 6: 1

Row 7: 1

Row 8: 1

Developing a Program with a Purpose — Row 1

The response earned a point for this row.

The video demonstrates the major feature of the program which is an attack system (including how to attack and earn EXP).

The written response indicates that this program is intended to be a turn-based game where players progress through levels by gaining EXP.

Developing a Program with a Purpose — Row 2

The response did not earn a point for this row.

The response does not describe or outline the steps used in the development of the entire program.

Developing a Program with a Purpose — Row 3

The response earned a point for this row.

The response describes two difficulties are encountered and how both were resolved.

The first difficulty described is how to unlock levels when a certain amount of EXP is reached. This is resolved by creating a function that checks to see if the EXP has reached the highest level.

The second difficulty described is the tracking of the health of the enemy. This is resolved by using a variable and a function to update the variable accordingly.

Applying Algorithms — Row 4

The response earned a point for this row.

The selected code segment for `twiAtk6` implements an algorithm.

Applying Algorithms — Row 5

The response earned a point for this row.

The selected algorithm includes logical concepts through the use of an if statement.

The response explains how the algorithm functions. The response states, “The code starts out by initiating `playerAttack...` Then, it checks to see if the enemy’s health is at 0 yet, and if it is, it will send you to the level screen again and reward you with gold, EXP, and health. If your health is at 0, it will only give you some health. Otherwise, the function `enemyAttack` is run...”

The response describes what the algorithm does in relation to the overall program. The response states, the algorithm is used “in order to fulfill working attack functions for all levels in the game.”

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Applying Algorithms — Row 6

The response earned a point for this row.

The selected code segments includes two or more algorithms, specifically `playerAttack`, `playerDeath`, `enemyDeath`, and `enemAttack`.

The response indicates that `playerAttack` includes mathematical and logical concepts. It states that the procedure “rolls a number from 1 to 100”, includes conditionals for “if the attack is critical”, and “subtracts the critical value... from the enemy’s health”.

The response explains how `playerAttack` functions independently. The response states, `playerAttack` “rolls a number from 1 to 100. It’s declared either a critical, a basic attack, or a miss. If the attack is critical, it subtracts the critical value rather than the basic value from the enemy’s health on top of what kind of damage is added on from any weapons you might have.”

Applying Abstraction — Row 7

The response earned a point for this row.

The selected code segment is a student-developed function `levelUnlock`.

Applying Abstraction — Row 8

The response earned a point for this row.

The response explains how the abstraction manages complexity. The response states, “Instead of having to individually go through and check the EXP requirements for every level whenever the level is completed, I can easily use the abstraction `levelUplock()` to simplify the complexity of my program.”

Sample: E

Row 1: 1

Row 2: 0

Row 3: 0

Row 4: 1

Row 5: 0

Row 6: 0

Row 7: 1

Row 8: 1

Developing a Program with a Purpose — Row 1

The response earned a point for this row.

The video shows the program running when they click on the block of code in the development environment.

The written response describes the feature's purpose and functionality.

Developing a Program with a Purpose — Row 2

The response did not earn the point for this row.

The response does not describe or outline the steps in the development process of the entire program.

Developing a Program with a Purpose — Row 3

The response did not earn a point for this row.

The response identifies two difficulties, but only describes how one was resolved.

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The first difficulty is how to create a new list from an initial list. The response indicates that experimentation with list was used, but it does not explain the experimentation with lists and what resolution was found through experimentation.

The second difficulty is how to take items from one list, use this data, and add to a second list. This is resolved by using "replace" to add items to the second list.

Applying Algorithms — Row 4

The response earned a point for this row.

The selected code segment (PRpoints) implements an algorithm.

Applying Algorithms — Row 5

The response did not earn a point for this row.

The selected code segment includes logical concepts through the use of if statements and for loops.

The response explains how the selected code segment functions.

The response does not describe what the selected algorithm does in relation to the overall purpose of the program.

Applying Algorithms — Row 6

The response did not earn a point for this row.

The selected code segment does not include two or more algorithms.

Applying Abstraction — Row 7

The response earned a point for this row.

The selected code segment is a student-developed function Timepoints.

Applying Abstraction — Row 8

The response earned a point for this row.

The response explains how this inclusion manages complexity by allowing for the diagnosis of a problem without having to look through the code in its entirety.

Sample: F

Row 1: 1

Row 2: 0

Row 3: 1

Row 4: 1

Row 5: 1

Row 6: 0

Row 7: 1

Row 8: 1

Developing a Program with a Purpose — Row 1

The response earned a point for this row.

The video demonstrates the continuous running of a chemistry experiments program and shows the feature of a slime experiment.

The response describes the purpose as being a chemistry program that children can understand and have fun.

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Developing a Program with a Purpose — Row 2

The response did not earn a point for this row.

The response does not describe or outline the steps used in the development process of the entire program.

Developing a Program with a Purpose — Row 3

The response earned a point for this row.

The response identifies only one of two difficulties.

The first difficulty was with the “sprites switching costumes depending on the experiment chosen by the user.”

This was resolved by “using broadcasts. When an experiment was chosen, a different broadcast message would be sent telling the program which experiment to begin.”

The second difficulty occurred “during the development of my algorithm that started the program and directed the program to start the chosen experiment.” The difficulty was resolved “by creating a variable for the answer given by the user.”

Applying Algorithms — Row 4

The response earned a point for this row.

The selected code segment implements an algorithm.

Applying Algorithms — Row 5

The response earned a point for this row.

The selected algorithm includes logical concepts through the use of if statements.

The response explains how the algorithm functions. The response states, the program asks the “user to input the number of experiment they would like to complete. The program then sets the user’s answer to a variable names answer. Then, three different if statements are used to figure out which experiment to start... broadcasts out a message.”

The response describes what this algorithm does in relationship to the overall purpose. It states, “This algorithm uses user input and if statements to help determine which experiment the program should begin with.”

Applying Algorithms — Row 6

The response did not earn a point for this row.

The selected algorithm does not include two or more algorithms.

Applying Abstraction — Row 7

The response earned a point for this row.

The selected code segment is a student-developed abstraction mix slime.

Applying Abstraction — Row 8

The response earned a point for this row.

The response explains how this abstraction manages complexity. It states it made it possible to “condense the movement of the spoon Sprite in the bowl. Instead of using six separate glide blocks to tell the spoon to move back and forth within the bowl, I created my own block to condense the code.”

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Sample: G

Row 1: 1

Row 2: 0

Row 3: 1

Row 4: 1

Row 5: 1

Row 6: 0

Row 7: 0

Row 8: 1

Developing a Program with a Purpose — Row 1

The response earned a point for this row.

The video demonstrates continuous running code.

The response identifies the program's intended purpose as "an adaptive inventory management system."

Developing a Program with a Purpose — Row 2

The response did not earn a point for this row.

The response does not describe or outline the steps in the development process to create the entire program.

Developing a Program with a Purpose — Row 3

The response earned a point for this row.

The response identifies two difficulties and describes how they were resolved.

The first difficulty is identified as how to save passwords. This is resolved by using text file.

The second difficulty is how to provide a level of security for stored passwords (and prompts). This is resolved by including encryption.

Applying Algorithms — Row 4

The response earned a point for this row.

The selected code segment implements an algorithm.

Applying Algorithms — Row 5

The response earns a point for this row.

The selected algorithm includes logical concepts in the use of a for loop.

The response explains how the algorithm functions. The response states, "It takes each individual character from the original input (from the letters String) and changes it to the corresponding letter/symbol in the shifted String."

The response describes what the algorithm does in relation to the overall purpose of the program. The response states, the algorithm is used "to encode the security question and password" for storage in a file.

Applying Algorithms — Row 6

The response did not earn a point for this row.

The selected program code includes two separate algorithms rather than one algorithm that includes two or more algorithms.

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Applying Abstraction — Row 7

The response did not earn a point for this row.
The selected program code is not an abstraction.

Applying Abstraction — Row 8

The response earned a point for this row.
The response explains how complexity is managed for the user not the program itself.

Sample: H

Row 1: 1

Row 2: 0

Row 3: 0

Row 4: 1

Row 5: 1

Row 6: 0

Row 7: 0

Row 8: 0

Developing a Program with a Purpose — Row 1

The response earned a point for this row.
The video is a continuous running of the program.
The response identified the purpose as “solely present a story in an interesting way.”

Developing a Program with a Purpose — Row 2

The response did not earn a point for this row.
The response does not describe or outline the steps in the development process of the entire program.

Developing a Program with a Purpose — Row 3

The response did not earn a point for this row.
The response identifies only one program development difficulty and describes how it was resolved.
The other difficulty is related to the brainstorming process and not the development of the program code. The difficulty identified is with the scoring system. It is resolved independently by creating the ECV function which takes the score value as a parameter and increasing it.

Applying Algorithms — Row 4

The response earned a point for this row.
The selected code segment is an algorithm.

Applying Algorithms — Row 5

The response earned a point for this row.
The selected algorithm uses logical concepts, through the use of if statements.
The response explains how the algorithm functions. The response states, the algorithm “uses logic and Boolean operators to get the desired result.”

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The response describes what the algorithm does in relation to the purpose of the program. The response states, “The outcome of the program is based on what the user decides to do, and their decision affects the plotline at this point, and then again at the end.”

Applying Algorithms — Row 6

The response did not earn a point for this row.

The selected algorithm does not include two or more algorithms.

Applying Abstraction — Row 7

The response did not earn a point for this row.

The student-developed abstraction, ECV() function, is not explicitly identified.

Applying Abstraction — Row 8

The response did not earn a point for this row.

The response does not indicate what the abstraction is and how it manages complexity. The response does state that the algorithm calls a function within another function, eliminating the need for rewriting the same code over and over.

Sample: I

Row 1: 1

Row 2: 0

Row 3: 0

Row 4: 1

Row 5: 0

Row 6: 0

Row 7: 0

Row 8: 0

Developing a Program with a Purpose — Row 1

The response earned a point for this row.

The video shows continuous running of the program.

The response identifies the purpose of the feature as "helping the user to learn French words for common colors."

Developing a Program with a Purpose — Row 2

The response did not earn a point for this row.

The response does not describe or outline the steps in the development process for the entire program.

Developing a Program with a Purpose — Row 3

The response did not earn a point for this row.

The response describes difficulties encountered during video capture for the artifact submission, not during program development.

Applying Algorithms — Row 4

The response earned a point for this row.

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The selected code segment is an algorithm.

Applying Algorithms — Row 5

The response did not earn a point for this row.

The selected algorithm does not include mathematical or logical concepts.

Applying Algorithms — Row 6

The response did not earn a point for this row.

The selected algorithm does not include two or more algorithms.

Applying Abstraction — Row 7

The response did not earn a point for this row.

The selected code segments are not student-developed abstractions.

Applying Abstraction — Row 8

The response did not earn a point for this row.

The response does not explain how abstraction is used for management of complexity.

Sample: J

Row 1: 1

Row 2: 1

Row 3: 0

Row 4: 1

Row 5: 0

Row 6: 0

Row 7: 0

Row 8: 1

Developing a Program with a Purpose — Row 1

The response earned a point for this row.

The video demonstrates the flipping of the cards and random card placement.

The response matches the video and indicates that the purpose of the program overall is to be a memory game with matching of cards.

Developing a Program with a Purpose — Row 2

The response earned a point for this row.

The response describes the overall development process used to develop this program.

The response includes how the process was incremental and iterative. The response states, that an aspect of the program was hindering the development, so it was “decided to make that a separate part of the program to not inhibit the creation process.” This problem was then resolved later in the development after other parts were developed.

Developing a Program with a Purpose — Row 3

The response did not earn a point for this row.

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The response only describes one difficulty and one resolution.

The one difficulty described in the response is with making the color dots random. It is resolved by storing the cards in an array.

Applying Algorithms— Row 4

The response earned a point for this row.

The selected code segment, function `drawCard()`, is an algorithm.

Applying Algorithms— Row 5

The response did not earn a point for this row.

The selected code segment does not include mathematical or logical concepts.

Applying Algorithms— Row 6

The response did not earn a point for this row.

The selected code segment includes two or more algorithms.

The selected code segment does not show the inner workings of the included algorithms, so it is unclear if the algorithms include mathematical or logical concepts.

The response does not explain how any of the included algorithms functions.

Applying Abstraction — Row 7

The response did not earn a point for this row.

The selected code segment does not explicitly identify the abstraction.

Applying Abstraction — Row 8

The response earned a point for this row.

The response indicates that the splitting of the board into component parts allowed the programmer to “focus on parts that would not directly interact at first, the making of the cards and the shuffling of the cards, before then making the program more complicated.”