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# AP<sup>®</sup> Computer Science Principles

## Scoring Guidelines Set 2

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**Video, Program Requirements, and Written Response 1****3 points****General Scoring Notes**

- Written responses should be evaluated solely on the rationale provided.
- Responses must demonstrate all scoring criteria, including those within bulleted lists, in each reporting category to earn the point for that category.
- Terms and phrases defined in the terminology list are italicized when they first appear.

Reporting Category	Scoring Criteria	Decision Rules
<b>Course Project: Video</b>  <b>(0–1 points)</b>	The video demonstrates the running of the program including: <ul style="list-style-type: none"> <li>• <i>input</i></li> <li>• <i>program functionality</i></li> <li>• <i>output</i></li> </ul>	<b>Consider the video (or Program Code if necessary) when scoring this point.</b> <ul style="list-style-type: none"> <li>• The video needs to show at least one aspect of the program’s functionality.</li> <li>• If the source of the input is unclear from the video, consider the full program code file when scoring this point.</li> </ul> <b>Do NOT award a point if the following is true:</b> <ul style="list-style-type: none"> <li>• The video does not show a demonstration of the program running (screenshots or storyboards are not acceptable and would not be credited).</li> </ul>
<b>Course Project: Program Requirements</b>  <b>(0–1 points)</b>	The program code includes: <ul style="list-style-type: none"> <li>• <i>A student-developed procedure</i></li> <li>• <i>A call to the student-developed procedure</i></li> <li>• <i>A list (or other collection type)</i></li> <li>• <i>A use of the list</i></li> <li>• <i>Selection</i></li> <li>• <i>Iteration</i></li> </ul>	<b>Consider the Personalized Project Reference (or Program Code if necessary) when scoring this point.</b> <ul style="list-style-type: none"> <li>• If the program requirements do not appear in the Personalized Project Reference, consider the full program code file when scoring this point.</li> <li>• The procedure does not need to have a <i>parameter</i> to earn this point.</li> <li>• The <i>code segments</i> demonstrating selection and iteration do not need to appear in the same <i>algorithm</i> to earn this point.</li> <li>• The code segments demonstrating selection and iteration do not need to be contained in a procedure to earn this point.</li> </ul> <b>Do NOT award a point if any one or more of the following is true:</b> <ul style="list-style-type: none"> <li>• The list is a one-element list.</li> <li>• The use of the list is irrelevant (i.e., not connected to the program’s functionality).</li> <li>• The call to the procedure is inconsistent with the procedure header (unless allowed by the programming language).</li> <li>• The use of either the selection or the iteration is trivial (i.e., does not affect the outcome of the program).</li> </ul>

Reporting Category	Scoring Criteria	Decision Rules
<p><b>Written Response 1: Program Design, Function, and Purpose</b></p> <p><b>(0–1 points)</b></p>	<p>The written response:</p> <ul style="list-style-type: none"> <li>identifies the expected group of users of the program.</li> <li>explains how the program addresses at least one concern or interest of the identified users.</li> </ul>	<p><b>Consider the Video (or Program Code if necessary) and Written Response 1 when scoring this point.</b></p> <ul style="list-style-type: none"> <li>If the video is not available or does not provide enough context to evaluate Written Response 1, consider the full program code file when scoring this point.</li> <li>The expected group of users can be a single user.</li> <li>The response must address at least one concern or interest of the identified group of users.</li> </ul> <p><b>Do NOT award a point if the following is true:</b></p> <ul style="list-style-type: none"> <li>Any of the explanations of how the program addresses the concerns or interests of the identified users is implausible, inaccurate, or inconsistent with the program.</li> <li>The expected group of users is everybody (or similar).</li> </ul>

**Written Response 2****3 points****General Scoring Notes**

- Written responses should be evaluated solely on the rationale provided.
- Written responses must demonstrate all scoring criteria, including those within bulleted lists, in each reporting category to earn the point for that category.
- Terms and phrases defined in the terminology list are italicized when they first appear.

Reporting Category	Scoring Criteria	Decision Rules
<p><b>Written Response 2(a): Algorithm Development</b></p> <p><b>(0–1 points)</b></p>	<p>The written response:</p> <ul style="list-style-type: none"> <li>• describes the conditional statement, including its Boolean expression.</li> <li>• describes what the program <i>code segment</i> inside the conditional statement does in general when the Boolean expression of the conditional statement is <i>false</i>.</li> </ul>	<p><b>Consider the Personalized Project Reference and Written Response 2(a) when scoring this point.</b></p> <ul style="list-style-type: none"> <li>• If multiple conditional statements are included in the Procedure section of the Personalized Project Reference, use the first conditional statement to determine whether the point is earned.</li> <li>• The conditional statement can be found in either part (i) or part (ii) of the Procedure section of the Personalized Project Reference.</li> <li>• The conditional statement does not need to be contained in a procedure to earn this point.</li> <li>• The response does not have to explicitly state the Boolean expression as long as it is described.</li> <li>• The response may earn this point for a conditional statement that either does or does not contain an else clause.</li> </ul> <p><b>Do NOT award a point if any one or more of the following is true:</b></p> <ul style="list-style-type: none"> <li>• The Procedure section of the Personalized Project Reference does not contain a conditional statement.</li> <li>• The description of the Boolean expression does not match the code in the first conditional statement.</li> <li>• The description of the behavior of the code when the expression is <i>false</i> does not match the code in the first conditional statement.</li> <li>• The response only recites lines of code instead of providing a general description.</li> <li>• The response describes a conditional statement or behavior that is implausible, inaccurate, or inconsistent with the program.</li> </ul>

Reporting Category	Scoring Criteria	Decision Rules
<p><b>Written Response 2(b): Errors and Testing</b></p> <p><b>(0–1 points)</b></p>	<p>The written response:</p> <ul style="list-style-type: none"> <li>describes the outcome of the procedure call based on the <i>argument(s)</i>, if any, used in the call.</li> </ul> <p>AND</p> <ul style="list-style-type: none"> <li>includes a procedure call with at least one different argument value that will produce the same outcome.</li> <li>explains why this call produces the same outcome.</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>explains why it is not possible to write a new procedure call with at least one different argument value that produces the same outcome.</li> </ul>	<p><b>Consider the Personalized Project Reference and Written Response 2(b) when scoring this point.</b></p> <ul style="list-style-type: none"> <li>If multiple procedures are included in part (i) of the Procedure section of the Personalized Project Reference: <ul style="list-style-type: none"> <li>Use the procedure identified in the written response to determine whether the point is earned.</li> <li>If no procedure is identified in the written response, then use the first procedure to determine whether the point is earned.</li> </ul> </li> <li>A procedure with explicit parameters, implicit parameters, or no parameters can earn this point if scoring guidelines are met.</li> <li>If the procedure has explicit or implicit parameters, the procedure call must include appropriate argument(s) that will lead to the described outcome or behavior.</li> <li>The syntax of the procedure call does not need to be correct as long as it identifies the correct arguments to the procedure, if necessary.</li> </ul> <p><b>Do NOT award a point if any one or more of the following is true:</b></p> <ul style="list-style-type: none"> <li>A procedure is not identified in part (i) of the Procedure section of the Personalized Project Reference.</li> <li>A procedure call is not included in part (ii) of the Procedure section of the Personalized Project Reference.</li> <li>The response does not apply to the procedure in part (i) or the procedure call in part (ii) of the Procedure section of the Personalized Project Reference.</li> <li>The response includes an explanation that is implausible, inaccurate, or inconsistent with the procedure and its given argument(s), if any.</li> </ul>

Reporting Category	Scoring Criteria	Decision Rules
<p><b>Written Response 2(c): Data and Procedural Abstraction</b></p> <p><b>(0–1 points)</b></p>	<p>The written response:</p> <ul style="list-style-type: none"> <li>identifies the <i>parameter(s)</i> of the procedure.</li> <li>explains how the identified parameter(s) use abstraction to manage complexity in their program.</li> </ul>	<p><b>Consider the Personalized Project Reference and Written Response 2(c) when scoring this point.</b></p> <ul style="list-style-type: none"> <li>If multiple procedures are included in part (i) of the Procedure section of the Personalized Project Reference, use the first procedure to determine whether the point is earned.</li> <li>The parameter(s) used in the procedure must be explicit. Explicit parameters are defined in the header of the procedure.</li> </ul> <p><b>Do NOT award a point if any one or more of the following is true:</b></p> <ul style="list-style-type: none"> <li>A procedure is not identified in part (i) of the Procedure section of the Personalized Project Reference.</li> <li>The response does not apply to the procedure in part (i) of the Procedure section of the Personalized Project Reference.</li> <li>The response identifies arguments instead of parameters for the first scoring criterion.</li> <li>The procedure identified in part (i) of the Procedure section of the Personalized Project Reference does not include at least one explicit parameter.</li> <li>The use of any of the parameters is irrelevant (i.e., does not affect the outcome of the procedure or is reassigned immediately before being used).</li> <li>The response includes an explanation that is implausible, inaccurate, or inconsistent with the procedure.</li> <li>The procedure is not a student-developed procedure (e.g. an event handler).</li> </ul>

## AP Computer Science Principles Create Performance Task Terminology

**Algorithm:** An algorithm is a finite set of instructions that accomplish a specific task. Every algorithm can be constructed using combinations of sequencing, selection, and iteration.

**Arguments:** The values of the parameters when a procedure is called.

**Code segment:** A code segment refers to a collection of program statements that are part of a program. For text-based, the collection of program statements should be continuous and within the same procedure. For block-based, the collection of program statements should be contained in the same starter block or what is referred to as a “Hat” block.

**Collection type:** Aggregates elements in a single structure. Some examples include: databases, hash tables, dictionaries, sets, or any other type that aggregates elements in a single structure.

**Data stored in a list:** Input into the list can be through an initialization or through some computation on other variables or list elements.

**Input:** Program input is data that are sent to a computer for processing by a program. Input can come in a variety of forms, such as tactile (through touch), audible, visual, or text. An event is associated with an action and supplies input data to a program.

**Iteration:** Iteration is a repetitive portion of an algorithm. Iteration repeats until a given condition is met or for a specified number of times. The use of recursion is a form of iteration.

**List:** A list is an ordered sequence of elements. The use of lists allows multiple related items to be represented using a single variable. Lists are referred to by different terms, such as arrays or arraylists, depending on the programming language.

**List being used:** Using a list means the program is creating new data from existing data or accessing multiple elements in the list.

**Output:** Program output is any data that are sent from a program to a device. Program output can come in a variety of forms, such as tactile, audible, visual, movement, or text.

**Parameter:** A parameter is an input variable of a procedure. Explicit parameters are defined in the procedure header. Implicit parameters are those that are assigned in anticipation of a call to the procedure. For example, an implicit parameter can be set through interaction with a graphical user interface.

**Procedure:** A procedure is a named group of programming instructions that may have parameters and return values. Procedures are referred to by different names, such as method, function, or constructor, depending on the programming language. A procedure is executed through the use of a procedure call.

**Program functionality:** The behavior of a program during execution, often described by how a user interacts with it.

**Purpose:** The problem being solved or creative interest being pursued through the program.

**Selection / conditional statement:** A selection / conditional statement affects the sequential flow of control by executing different statements based on a condition being true or false. The use of if-statements and try / exception statements are examples of selection / conditional statements.

**Sequencing:** The application of each step of an algorithm in the order in which the code statements are given.

**Student-developed procedure / algorithm:** Program code that is student-developed has been written (individually or collaboratively) by the student who submitted the response. Calls to existing program code or libraries can be included but are not considered student-developed. Event handlers are built-in abstractions in some languages and will therefore not be considered student-developed. In some block-based programming languages, event handlers begin with “when.”