Create PT 20-21 College Board Sample C - Score: 4/6

Total score	Row 1	Row 2	Row 3	Row 4	Row 5	Row 6
Sample: 3	**1**	**1**	**0**	**1**	**0**	**1**

1. **Program Code**
   Your program must demonstrate:
   - output (tactile, visual, or textual) based on input from:
     - the user (including user actions that trigger events); or
     - a device; or
     - a file
   - use of at least one list (or other collection type) to represent a collection of data related to the program's purpose; and
   - development of at least one procedure that uses one or more parameters to accomplish the program's intended purpose, and that implements an algorithm that includes sequencing, selection, and iteration.

   Include comments or acknowledgements for any part of the submitted program code that has been written by someone other than you and/or your collaborative partner(s).

   Create a PDF file that contains all your program code (including comments).

2. **Video**
   Your video must demonstrate your program running, including:
   - input to your program; and
   - at least one aspect of the functionality of your program; and
   - output produced by your program.

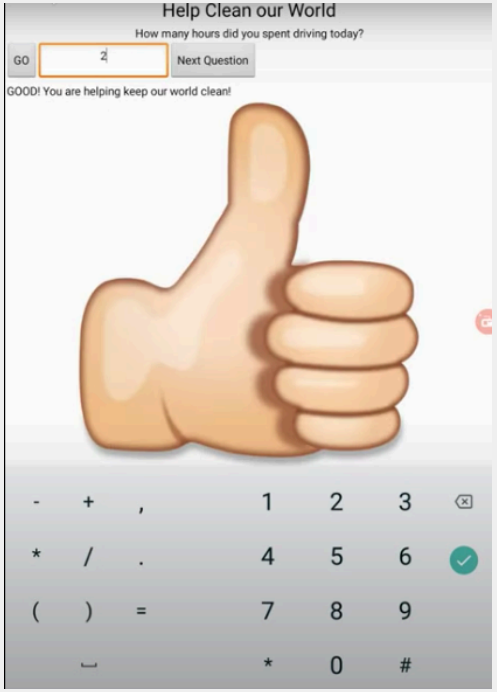
   Your video:
   - must be either .mp4, .wmv, .avi, or .mov format; and
   - must not exceed 1 minute in length; and
   - must not exceed 30 MB in file size.

   Collaboration is not allowed during the development of your video. Your video must not contain any distinguishing information about yourself. Your video must not be narrated, but text captions are encouraged.

3. **Written Responses**
   Submit one PDF file that includes your responses to each prompt below. Clearly label your responses 3a-3d in order. Your responses to all prompts combined must not exceed 750 words, exclusive of the program code. Collaboration is not allowed when answering the written responses.

   3a. Provide a written response that:

- describes the overall purpose of the program; and
- describes what functionality the video illustrates; and
- describes the input and output shown in the video.

<table>
<tr><th>Student Response</th><th colspan="2">Scoring Guidelines</th></tr>
<tr><td rowspan="2"> 

My app is intended to lessen the effects of global warming and to decrease the amount of non recyclable waste we produce. In the video, you can see the question label that displays a random list item from “global questions list”. Once the user reads the question, they answer it using the text box. Depending on the users input, the program will produce various outputs, which it pulls from “global solutions list”. If the program decides the user spends too much time driving, using their AC, or</td><td>Row and Task</td><td>Decision Rules</td></tr>
<tr><td>Row 1
Video and Written Response 3a

Program Purpose and Function

4.A, CRD-2B

● The video demonstrates the running of the program including:
○ input
○ program functionality
○ output
AND
● The written response:
○ describes the overall purpose of the program.
○ describes what functionality of the program is demonstrated in the video
○ describes the input and output of the program demonstrated in the video.</td><td>Consider ONLY the video and written response 3a when scoring this point.

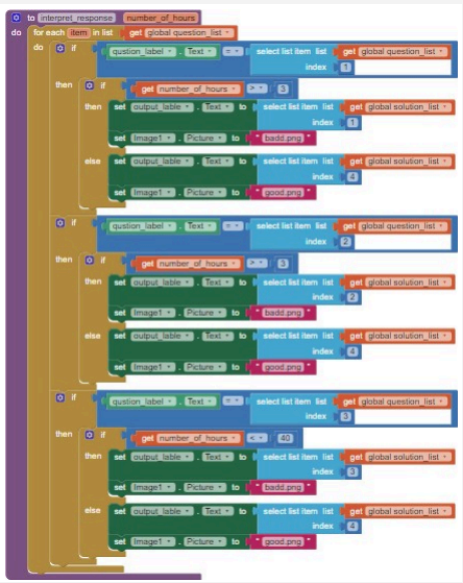
Do NOT award a point if the following is true:
● the video does not show a demonstration of the program running (screenshots or storyboards are not acceptable and would not be credited.)</td></tr>
<tr><td colspan="2">The response earned the point for this row, meeting all six criteria.
● The video demonstrates the running of the program, including input (user answering questions), functionality (processing of user input), and output (statement and visual “thumbs-up” or “thumbsdown”). This satisfies the first three criteria for the video.
● The response describes the program’s overall purpose as being “to lessen the effects of global warming and to decrease the amount of non recyclable [sic] waste we produce.”
● The response describes the functionality as follows: “displays a random list item from ‘global questions list’.”
● The response describes the input and output as “Once the user reads the question, they answer it using the text box. Depending on the users [sic] input, the program will produce various outputs, which it pulls from ‘global solutions list,’” and, “Also, a thumbs down image is displayed, unless the input indicates they are being good with their emissions. In that case, a thumbs up is displayed and ‘output label’ tells the user they are doing good and to keep it up.”</td></tr>
</table>

doesn't recycle enough, they will notify them by displaying an output on "output label" that tells them what they can do to lessen their carbon footprint. Also, a thumbs down image is displayed, unless the input indicates they are being good with their emissions. In that case, a thumbs up is displayed and "output label" tells the user they are doing good and to keep it up.	

3b. Capture and paste two program code segments you developed during the administration of this task which contain a list (or other collection type) being used in your program. The first program code segment must show how data has been stored in the list. The second program code segment must show the data in the same list being processed, such as creating new data from the existing data. Then, provide a written response that:

- identifies the name of the list being processed in this response; and
- identifies what the data contained in the list is representing in your program; and
- explains how the selected list manages complexity in your program code by explaining how your program code would be written differently without using this list.

Student Response	**Scoring Guidelines**	
	**Row and Task**	**Decision Rules**
	Row 2 - Response 3b **Data Abstraction** **3.B, AAP-1.C** The written response: ● includes two program segments: ○ one that shows how data has been stored in this list (or other collection type) ○ one that shows the data in this same list being used as part of fulfilling the program's purpose.	**Consider ONLY written response 3b when scoring this point.** **Requirements for program code segments:** ● The written response must include two clearly distinguishable program code segments, but these segments may be disjoint code segments or two parts of a contiguous code segment. ● If the written response includes more than two code segments, use the first two code segments to determine whether or not the point is earned. **Do NOT award a point if the following is true:** ● The use of the list is trivial and does not assist in fulfilling the program's purpose.



The data in "questions_list" are questions that the program displays for the user. The questions are then interpreted by the user and the user gives the program its input through the text box. The procedure check through "questions list" to see which element in the list matches the question that is displayed on "question label" so that it can provided the right "output label" based on the "number of hours" that was input. The use of the questions_list manages complexity in my program, because the program would be more complicated if I had to type the question into the if statements.

- identifies the name of the variable representing the list being used in this response
- describes what the data contained in this list is representing in the program.

The response earned the point for this row, meeting all three criteria.

- The response includes program code segments for initialization of two named lists, solution_list and question_list, as well as a code segment showing how the data in both lists are processed as a part of fulfilling the program's purpose of questioning the user and evaluating responses.
- The response identifies the list to be considered as question_list, so this is the list that was used to determine the score.
- The response describes the data in question_list to be "questions that the program displays for the user."

Row 3 - Response 3b

Managing Complexity

3.C, AAP-3.C

The written response:

- includes a program code segment that shows a list being used to manage complexity in the program.
- explains how the named, selected list manages complexity in the program code by explaining why the program code could not be written, or how it would be written differently, without using this list.

Consider ONLY written response 3b when scoring this point.

Responses that do not earn row 2, may still earn this row.

Do NOT award a point if any one or more of the following is true:

- The code segments containing the lists are not separately included in the written response section (not included at all, or the entire program is selected without explicitly identifying the code segments containing the list).
- The written response does not name the selected list (or other collection type).
- The use of the list is irrelevant or not used in the program.
- The explanation does not apply to the selected list.
- The explanation of how the list manages complexity is implausible, inaccurate, or inconsistent with the program.
- The solution without the list is implausible, inaccurate, or inconsistent with the program.
- The use of the list does not result in a program that is easier to develop, meaning alternatives presented are equally complex or potentially easier.

		● The use of the list does not result in a program that is easier to maintain, meaning that future changes to the size of the list would cause significant modifications to the code.
	The response DOES NOT earn the point for this row. The response does not meet either of the criteria. ● The procedure, interpret_response, shows the list question_list being used; however, the value of each index in the list that is being stored in item is never used, making the list irrelevant. Instead, the list access and processing have been hard-coded based on list index number and do not manage complexity in the program as written, since the code has not been made easier to maintain and changes to the size of the list would require significant modifications to the code. ● The response states, “The use of the question_list manages complexity in my program, because the program would be more complicated if I had to type the question into the if statements.” However, the code only uses lists to replace the question strings in a hard-coded manner, so the use of the list is irrelevant. Additionally, changes to the size of the list (i.e., the number of questions) would necessitate significant modifications to the code.	

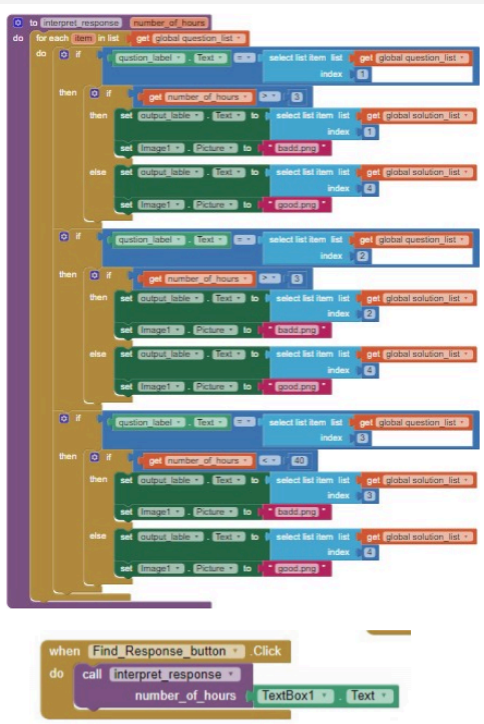
3c. Capture and paste a procedure from your program that you developed during the administration of this task which implements an algorithm used in your program. This procedure must:

- contain and use one or more parameters that have an effect on the functionality of the procedure; and
- implements an algorithm that includes sequencing, selection, and iteration.

Then, provide a written responses that:

- describes what the selected procedure does and how it contributes to the overall functionality of the program; and
- explains how the algorithm implemented in the selected procedure accomplishes its task.

Student Response	**Scoring Guidelines**

<table>
<tr>
<td rowspan="3"> 

The procedure “interpret_response” has a parameter and selects the response for the user based on the question and the user input. Without it, my program wouldn’t function at all. So, the program displays the question, the user interprets it and then feeds the program data, which is their response to the question. The data that the user inputs to the program is the text from the text box. That text is the parameter for procedure “interpret response”, in the procedure, the user's input is called “number of hours”. Procedure “interpret response” processes the</td>
<td>Row and Task</td>
<td>Decision Rules</td>
</tr>
<tr>
<td>Row 4 - Response 3c

Procedural Abstraction

3.B, AAP-3.C

The written response:
● includes two program code segments:
○ one showing a student-developed procedure with at least one parameter that has an effect on the functionality of the procedure.
○ one showing where the student-developed procedure is being called.

● describes what the identified procedure does and how it contributes to the overall functionality of the program.</td>
<td>Consider ONLY written response 3c when scoring this point.

Requirements for program code segments:
● The procedure must be student developed, but could be developed collaboratively with a partner.
● If multiple procedures are included, use the first procedure to determine whether the point is earned.

Do NOT award a point if any one or more of the following is true:
● the code segment is an event handler; OR
● the code segment consisting of the procedure is not included in the written response section; OR
● the written response describes what the procedure does independently without relating it to the overall function of the program.</td>
</tr>
<tr>
<td colspan="2">The response earned the point for this row, meeting both criteria.
● The response includes a student-developed procedure, interpret_response, which has a parameter, number_of_hours, that affects the functionality of the procedure. The response provides a code segment showing a call to interpret_response from the Find_Response_button.Click event.
● The response describes what the procedure does: it “processes the ‘number of hours’ and formulates an output that it will pull from the list ‘solution list’ based on the question and the number of hours,” and it “uses a loop that checks what question is displayed to the user, so it can understand the parameter in the context of what question is being asked.”</td>
</tr>
<tr>
<td>Row 5 - Response 3c

Algorithm Implementation

2.B, AAP-2.H, AAP-2.K</td>
<td>Consider ONLY written response 3c when scoring this point.

Responses that do not earn row 4 may still earn this row.

Requirements for program code segments:</td>
</tr>
</table>

"number of hours" and formulates an output that it will pull from the list "solution list" based on the question and the number of hours. The procedure uses a loop that checks what question is displayed to the user, so it can understand the parameter in the context of what question is being asked. After analyzing the question that is displayed and the "number of hours", the procedure will pull different strings from a second list, "solutions list". If the user indicates that they are harming the environment through the "number of hours", the procedure will pull an output from the second list that notifies the user that they are doing harm to the environment, and give them ways to lessen their effects. Also, an image property is set to thumbs down. If "number of hours" indicates they are being good to the environment, the program will notify them and congratulate them on their safe living. Also, the image property is set to a thumbs up.	The written response: ● includes a student-developed algorithm that includes: ○ sequencing ○ selection ○ iteration ● explains in detailed steps how the identified algorithm works in enough detail that someone else could recreate it.	● The algorithm being described can utilize existing language functionality or library calls. ● An algorithm that contains selection and iteration, also contains sequencing. ● An algorithm containing sequencing, selection, and iteration that is not contained in a procedure can earn this point. ● Use the first code segment, as well as any included code for procedures called within this first code segment, to determine whether the point is earned. ● If this code segment calls other student-developed procedures, the procedures called from within the main procedure can be considered when evaluating whether the elements of sequencing, selection, and iteration are present as long as the code for the called procedures is included. **Do NOT award a point if any one or more of the following is true:** ● The response only describes what the selected algorithm does without explaining how it does it. ● The description of the algorithm does not match the included program code. ● The code segment consisting of the selected algorithm is not included in the written response. ● The algorithm is not explicitly identified (i.e., the entire program is selected as an algorithm without explicitly identifying the code segment containing the algorithm). ● The use of either the selection or the iteration is trivial and does not affect the outcome of the program.
	The response DOES NOT earn the point for this row. The response met only one of the two criteria. ● The response includes a program code segment of a student-developed algorithm found in the body of the interpret_response procedure. This algorithm appears to include sequencing, selection (if, then), and iteration (for each and do); however, the iteration is trivial, as the value of item is never used and the outcome is the same whether this code iterates one time or many times. ● The response explains how the algorithm sequence works using "a loop that checks what question is displayed to the user, so it can understand the parameter in the context of what question is being asked. After analyzing the question that is displayed and the 'number of hours', the procedure will pull different strings from a second list, 'solutions list…. Also, an image property is set" based on the number of hours indicated so that the user receives a string and visual output based on processing of the data input.	

3d. Provide a written response that:

- describes two calls to the selected procedure identified in written response 3c. Each call must pass different arguments that cause a different segment of code in the algorithm to execute; and
- describes what condition(s) is being tested by each call to the procedure; and
- identifies the result of each call.

<table>
<tr><th>Student Response</th><th colspan="2">Scoring Guidelines</th></tr>
<tr><td rowspan="2">If the question label is equal to the second element in “question list” and the parameter “number of hours” (equal to the text box text) is 6, then the second element in “solutions list” will be displayed on “output label” and image property will be set to badd.png. In this scenario, the question asked to the user asks how many hours their AC was on during that day. The user inputs 6 to the text box, indicating that their AC was on for 6 hours. This is where I wanted a message to display to the user that they are using their AC too much and offer them alternatives. So, I created a list with solutions and that message is the second element in “solution list”, so that is why the program pulls the second element from “solution list” and displays it on “output label” when the user inputs 6 for the question at index 2 in “questions list.
Another scenario, if the first element in “question list” is equal to the string displayed in “question label” and the text input by the user, or “number of hours”, is 1, then the fourth element in “solution list” is pulled and displayed on the output label and the</td><td>Row and Task</td><td>Decision Rules</td></tr>
<tr><td>Row 6 - Response 3d

Testing

4.C, CRD-2.J

The written response:
describe two calls to the selected procedure identified in written response 3c. Each call must pass a different argument(s) that causes a different segment of code in the algorithm to execute.
describes the condition(s) being tested by each call to the procedure.
identifies the result of each call.</td><td>Consider ONLY written response 3d when scoring this point.

Responses that do not earn row 4 may still earn this row.

Do NOT award a point if any one or more of the following is true:
A procedure is not identified in written response 3c or the procedure does not have a parameter.
The written response for 3d does not apply to the procedure in 3c.
The two calls cause the same segment of code in the algorithm to execute even if the result is different.
The response describes conditions being tested that are implausible, inaccurate, or inconsistent with the program.
The identified results of either call are implausible, inaccurate, or inconsistent with the program.</td></tr>
<tr><td colspan="2">The response earned the point for this row, meeting all three criteria.
The response describes two calls to the interpret_response procedure. The first call asks, “how many hours their AC was on,” where the “number of hours” parameter is “6.” The second calls asks, “the question ... how long the user had spent driving on that day,” where the “number of hours” parameter is “1.”
The response describes the conditions as “[when to] display to the user that they are using their AC too much” or “when they aren’t emitting too many fossil fuels [sic].”
The response states that the result of the first call will “display to the user that they are using their AC too much and offer them alternatives,” and that the result of the second call “will display element 4 from ‘solutions list’ that notifies the user that they are doing a good job and that they aren’t emitting too many</td></tr>
</table>

image is set to “good.png”. In the context of my program, this scenario would mean the question asks how long the user had spent driving on that day. The program recognizes this is the question being asked and since the parameter is less than 3, then the program will display element 4 from “solutions list” that notifies the user that they are doing a good job and that they aren’t emitting too many fossil fuels. The user will also be encouraged to keep it up and a thumbs up image will pop up.	fossil fuels [sic].”