SUGGESTED SKILLS

1.B

Determine code that would be used to complete code segments.

5.A

Describe the behavior of a given segment of program code.

AVAILABLE RESOURCES

- Runestone Academy: AP CSA—Java Review: 12—Recursion
- Practice-It!: BJP4 Chapter 12: Recursion—Self-Check 12.3–12.6, 12.13–12.15
- CodingBat Java: Recursion

TOPIC 10.1 Recursion

Required Course Content

ENDURING UNDERSTANDING

CON-2

Programmers incorporate iteration and selection into code as a way of providing instructions for the computer to process each of the many possible input values.

LEARNING OBJECTIVE

CON-2.O

Determine the result of executing recursive methods.

ESSENTIAL KNOWLEDGE

CON-2.O.1

A recursive method is a method that calls itself.

CON-2.O.2

Recursive methods contain at least one base case, which halts the recursion, and at least one recursive call.

CON-2.O.3

Each recursive call has its own set of local variables, including the formal parameters.

CON-2.O.4

Parameter values capture the progress of a recursive process, much like loop control variable values capture the progress of a loop.

CON-2.O.5

Any recursive solution can be replicated through the use of an iterative approach.

EXCLUSION STATEMENT—(EK CON-2.O.5): Writing recursive program code is outside the scope of the course and AP Exam.

CON-2.O.6

Recursion can be used to traverse `String`, array, and `ArrayList` objects.

TOPIC 10.2
Recursive Searching and Sorting

Required Course Content

ENDURING UNDERSTANDING

CON-2

Programmers incorporate iteration and selection into code as a way of providing instructions for the computer to process each of the many possible input values.

LEARNING OBJECTIVE

CON-2.P

Apply recursive search algorithms to information in `String`, 1D array, or `ArrayList` objects.

ESSENTIAL KNOWLEDGE

CON-2.P.1

Data must be in sorted order to use the binary search algorithm.

CON-2.P.2

The binary search algorithm starts at the middle of a sorted array or `ArrayList` and eliminates half of the array or `ArrayList` in each iteration until the desired value is found or all elements have been eliminated.

CON-2.P.3

Binary search can be more efficient than sequential/linear search.

EXCLUSION STATEMENT—(EK CON-2.P.3): Search algorithms other than sequential/linear and binary search are outside the scope of the course and AP Exam.

CON-2.P.4

The binary search algorithm can be written either iteratively or recursively.

CON-2.Q

Apply recursive algorithms to sort elements of array or `ArrayList` objects.

CON-2.Q.1

Merge sort is a recursive sorting algorithm that can be used to sort elements in an array or `ArrayList`.

SUGGESTED SKILLS

2.C

Determine the result or output based on the statement execution order in a code segment containing method calls.

2.D

Determine the number of times a code segment will execute.

AVAILABLE RESOURCES

- Runestone Academy: AP CSA—Java Review: 13.3—Binary Search
- Runestone Academy: AP CSA—Java Review: 13.6—Merge Sort
- Practice-It!: BJP4 Chapter 12: Recursion—Exercises 12.1–12.3, 12.6–12.14, 12.18–12.22
- Practice-It!: BJP4 Chapter 13: Searching and Sorting—Self-Check 12.30