SUGGESTED SKILL

2.A

Apply the meaning of specific operators.

AVAILABLE RESOURCES

- Practice-It!: BJP4 Chapter 4: Conditional Execution—Self-Check 4.2

TOPIC 3.1
Boolean Expressions

Required Course Content

ENDURING UNDERSTANDING

CON-1

The way variables and operators are sequenced and combined in an expression determines the computed result.

LEARNING OBJECTIVE

CON-1.E

Evaluate Boolean expressions that use relational operators in program code.

ESSENTIAL KNOWLEDGE

CON-1.E.1

Primitive values and reference values can be compared using relational operators (i.e., == and `!=`).

CON-1.E.2

Arithmetic expression values can be compared using relational operators (i.e., <, >, <=, >=).

CON-1.E.3

An expression involving relational operators evaluates to a Boolean value.

TOPIC 3.2
`if` Statements and Control Flow

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.A

Represent branching logical processes by using conditional statements.

ESSENTIAL KNOWLEDGE

CON-2.A.1

Conditional statements interrupt the sequential execution of statements.

CON-2.A.2

`if` statements affect the flow of control by executing different statements based on the value of a Boolean expression.

CON-2.A.3

A one-way selection (`if` statement) is written when there is a set of statements to execute under a certain condition. In this case, the body is executed only when the Boolean condition is `true`.

SUGGESTED SKILLS

2.B

Determine the result or output based on statement execution order in a code segment without method calls (other than output).

3.C

Write program code to satisfy method specifications using expressions, conditional statements, and iterative statements.

AVAILABLE RESOURCES

- Runestone Academy: AP CSA—Java Review: 5.1—Conditionals
- Practice-It!: BJP4 Chapter 4: Conditional Execution—Self-Check 4.3; Exercises 4.2 and 4.3
- The Exam > 2017 AP Computer Science A Exam Free-Response Question #1, Part A (Phrase)

SUGGESTED SKILLS

3.C

Write program code to satisfy method specifications using expressions, conditional statements, and iterative statements.

4.A

Use test-cases to find errors or validate results.

AVAILABLE RESOURCES

- Runestone Academy: AP CSA—Java Review: 5.1—Conditionals
- Practice-It!: BJP4 Chapter 4: Conditional Execution—Self-Check 4.5–4.6, 4.10–4.12

TOPIC 3.3
`if-else` Statements

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.A

Represent branching logical processes by using conditional statements.

ESSENTIAL KNOWLEDGE

CON-2.A.4

A two-way selection is written when there are two sets of statements— one to be executed when the Boolean condition is `true`, and another set for when the Boolean condition is `false`. In this case, the body of the "if" is executed when the Boolean condition is `true`, and the body of the "else" is executed when the Boolean condition is `false`.

TOPIC 3.4
`else if` Statements

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.A

Represent branching logical processes by using conditional statements.

ESSENTIAL KNOWLEDGE

CON-2.A.5

A multi-way selection is written when there are a series of conditions with different statements for each condition. Multi-way selection is performed using `if-else-if` statements such that exactly one section of code is executed based on the first condition that evaluates to true.

SUGGESTED SKILLS

3.C

Write program code to satisfy method specifications using expressions, conditional statements, and iterative statements.

4.C

Determine if two or more code segments yield equivalent results.

AVAILABLE RESOURCES

- Runestone Academy: AP CSA—Java Review: 5.2—Three or More Options

SUGGESTED SKILLS

2.B

Determine the result or output based on statement execution order in a code segment without method calls (other than output).

3.C

Write program code to satisfy method specifications using expressions, conditional statements, and iterative statements.

AVAILABLE RESOURCES

- Runestone Academy: AP CSA—Java Review: 5.3—Complex Conditionals
- Practice-It!: BJP4 Chapter 4: Conditional Execution—Exercise 4.12

TOPIC 3.5
Compound Boolean Expressions

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.B

Represent branching logical processes by using nested conditional statements.

ESSENTIAL KNOWLEDGE

CON-2.B.1

Nested `if` statements consist of `if` statements within `if` statements.

ENDURING UNDERSTANDING

CON-1

The way variables and operators are sequenced and combined in an expression determines the computed result.

LEARNING OBJECTIVE

CON-1.F

Evaluate compound Boolean expressions in program code.

ESSENTIAL KNOWLEDGE

CON-1.F.1

Logical operators `!` (not), `&&` (and), and `||` (or) are used with Boolean values. This represents the order these operators will be evaluated.

CON-1.F.2

An expression involving logical operators evaluates to a Boolean value.

CON-1.F.3

When the result of a logical expression using `&&` or `||` can be determined by evaluating only the first Boolean operand, the second is not evaluated. This is known as short-circuited evaluation.

TOPIC 3.6
Equivalent Boolean Expressions

SUGGESTED SKILL

4.C

Determine if two or more code segments yield equivalent results.

AVAILABLE RESOURCE

- Runestone Academy: AP CSA—Java Review: 5.5—De Morgan's Laws

Required Course Content

ENDURING UNDERSTANDING

CON-1

The way variables and operators are sequenced and combined in an expression determines the computed result.

LEARNING OBJECTIVE

CON-1.G

Compare and contrast equivalent Boolean expressions.

ESSENTIAL KNOWLEDGE

CON-1.G.1

De Morgan's Laws can be applied to Boolean expressions.

CON-1.G.2

Truth tables can be used to prove Boolean identities.

CON-1.G.3

Equivalent Boolean expressions will evaluate to the same value in all cases.

SUGGESTED SKILLS

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

3.A
Write program code to create objects of a class and call methods.

TOPIC 3.7
Comparing Objects

Required Course Content

ENDURING UNDERSTANDING

CON-1
The way variables and operators are sequenced and combined in an expression determines the computed result.

LEARNING OBJECTIVE

CON-1.H
Compare object references using Boolean expressions in program code.

ESSENTIAL KNOWLEDGE

CON-1.H.1
Two object references are considered aliases when they both reference the same object.

CON-1.H.2
Object reference values can be compared, using == and `!=`, to identify aliases.

CON-1.H.3
A reference value can be compared with `null`, using == or `!=`, to determine if the reference actually references an object.

CON-1.H.4
Often classes have their own `equals` method, which can be used to determine whether two objects of the class are equivalent.