Students:
Section 3.1 is a part of 2 assignments: CSC108 CH03.1-3.10 C3A

Includes: DA
Due: 03/30/2023, 11:59 PM EST

This assignment's due date has passed. Activity will still be recorded, but will not count towards this assignment (unless the due date is changed). See this article for more info.

3.1 If-else branches (general)

Branch concept

People familiar with restaurants may be familiar with steering people to different-sized tables based on group size.

PARTICIPATION ACTIVITY 3.1.1: Branching concept.

Start | To speed

Party of: 2 (Large)

If party of 1: 1 Counter

Else if party of 2: 2

Else: 4 5 6

Captions:

1. A restaurant host seats patrons. The host seats a party of 1 at the counter.
2. A party of 2 is seated at a small table. Other sized parties are seated at a large table.
3. The host mentally executes the algorithm: If party of 1, seat at counter; Else if party of 2, seat at small table; Else seat at large table.

Feedback?

PARTICIPATION ACTIVITY 3.1.2: Branch concept.

Consider the example above.

1) A party of 1 is sat at _____.
- the counter
- a small table

2) A party of 2 is sat at _____.
- the counter
- a small table

3) A party of 6 is sat _____.
- at a large table
- nowhere

Feedback?

Branch basics (if)

In a program, a **branch** is a sequence of statements only executed under a certain condition. Ex: A hotel may discount a price only for people over age 65. An **if** branch is a branch taken only if an expression is true.

PARTICIPATION ACTIVITY 3.1.3: Branches: Hotel rate example.

Start | To speed

hotelRate = 135

userAge = 68

hotelRate = hotelRate - 20

Yes: Time: 0ms, no delay

Pause for 1 second to replay

135 hotelRate integer
68 userAge integer

Input
68

Output
Total rate: 135

Captions:

1. A decision leads to two program branches. If the expression is true, the first branch executes. Else, the second branch executes.
2. If userAge is 68, then 68 > 65 is true. So the first branch executes, which discounts hotelRate.
3. Execution rejoins the other branch, and continues with subsequent statements, outputting 135. If userAge were instead 50, the output would be 155.

Feedback?

PARTICIPATION ACTIVITY 3.1.4: Branches.

Consider the hotel rate example above.

1) If userAge is 20, does the true or false branch execute?
- True branch
- False branch

2) If userAge is 20, does the executed branch update hotelRate?
- Yes
- No

3) If userAge is 20, what hotel rate does the program output?
- 135
- 115

4) If userAge is 70, what hotel rate does the program output?
- 135
- 115

5) Do the last two statements always execute for any value of userAge?
- Yes
- No

Feedback?

If branch example: Absolute value

The example below shows how an if branch can be used to compute an absolute value of a number:

PARTICIPATION ACTIVITY 3.1.5: Computing absolute value. Full screen

Variables
0 val integer

Input
-99

Output

ENTER EXECUTION | STEP | RUN | Execution speed Medium

Feedback?

PARTICIPATION ACTIVITY 3.1.6: Example if branch: Absolute value.

Consider the example above.

1) If the input is -9, does the branch execute?
- Yes
- No

2) If the input is 5, does the branch execute?
- Yes
- No

Feedback?

If-else branches

An **if-else** branch has two branches: The first branch is executed if an expression is true, ELSE the other branch is executed.

In the example below, if a user inputs an age less than 25, the statement `insuranceFee = 4800` executes. Else, `insuranceFee = 2200` executes.

PARTICIPATION ACTIVITY 3.1.7: Insurance price. Full screen

Variables
0 userAge integer
0 insuranceFee integer

Input
22

Output

ENTER EXECUTION | STEP | RUN | Execution speed Medium

Feedback?

Car insurance prices

Car insurance prices for drivers under 25 are higher because 1 in 6 such drivers are involved in an accident each year vs. 1 in 15 for older drivers. Source: Insurance Information Institute, 2015)

PARTICIPATION ACTIVITY 3.1.8: If-else branches.

Consider the insurance price example above.

1) If userAge is 18, what price is output?
- 4800
- 2200

2) If userAge is 30, what price is output?
- 4800
- 2200

3) If userAge is 25, what price is output?
- 4800
- 2200

4) For what value of userAge will both branches execute?
- 15
- 25
- None

5) For what value of userAge will neither branch execute?
- 30
- 25
- None

6) For what value of userAge will the output statements not execute?
- 30
- 25
- None

Feedback?

If-else example: Max

The example below shows how an if-else can be used to get the maximum of two values.

PARTICIPATION ACTIVITY 3.1.9: If-else branches example: Max. Full screen

Variables
0 x integer
0 y integer
0 max integer

Input
10 15

Output

ENTER EXECUTION | STEP | RUN | Execution speed Medium

Feedback?

PARTICIPATION ACTIVITY 3.1.10: If-else example: Max.

Consider the example above.

1) When the input is 3 0, which branch executes?
- If
- Else

2) When the input is 99 99, which branch executes?
- If
- Else

3) The if branch assigns max = x. The else branch assigns max = ?
- x
- y

4) If the inputs are 5 5, does max get assigned with x or y?
- x
- y

Feedback?

If-elseif-else branches

Commonly a programmer wishes to take one of multiple (three or more) branches. An if-else can be extended to an if-elseif-else structure. Each branch's expression is checked in sequence, as soon as one branch's expression is found to be true, that branch is taken. If no expression is found true, execution skips to the else branch, which then executes.

Note: The else part is optional. If omitted, then if none of the previous expressions are true, no branch executes.

PARTICIPATION ACTIVITY 3.1.11: If-elseif example: Anniversaries.

Start | To speed

numYears = 5

Anyone who is 1 year anniversary will receive a free Starbucks card.

numYears == 1

Yes: Starbucks is output

Anyone who is 5 year anniversary will receive a free Starbucks card.

numYears == 5

Yes: Starbucks is output

Anyone who is 10 year anniversary will receive a free Starbucks card.

numYears == 10

Yes: Starbucks is output

0 numYears integer

Captions:

1. This program detects the specific value of a variable. If numYears is 1, the first branch executes and "Newlywed" is output.
2. Else, if numYears is 25, the second branch executes and "Silver" is output. Else, if numYears is 50, the third branch executes and "Golden" is output.
3. Else, the last branch executes.

Feedback?

PARTICIPATION ACTIVITY 3.1.12: If-elseif-else.

Consider the if-elseif-else structure below:

```
if x equals 1:
    Print "Congrats!" to output
elif x equals 2:
    Print "Neutral" to output
elif x equals 3:
    Print "Agrees" to output
else:
    Print "Invalid entry" to output
```

1) If x is 1, what is output?
- Disagrees
- Neutral
- Agrees
- Invalid entry

2) If x is -2, what is output?
- Disagrees
- Invalid entry
- (Nothing is output)

3) Could the programmer have written the three branches in the order x equals 1, x equals 2, and x equals 3, and achieved the same results?
- No
- Yes

4) In the code above, suppose a programmer, after the third branch (x equals 1), inserts a new branch: Else if x equals 1: ... When might that new branch execute?
- When x is -1
- When x is 1
- Never

5) In the code above, suppose a programmer removed the Else part entirely. If x is 2, which is correct?
- The last branch, meaning the Else if x equals 1 branch, will execute
- No branch will execute.
- The program is not legal.

Feedback?

CHALLENGE ACTIVITY 3.1.1: If-else branches.

Note:

1. The provided integer variable shows the value of the variable before the program executes.
2. Level 5 uses <=, known as the equality operator, to mean equals. Ex: `x <= 3` means `x equals 3`

Start

Type the program's output

Variables
0 numApples integer

Output
Ch

Check | Next

Feedback?

How was this section? Provide section feedback

Activity summary for assignment: CSC108 CH03.1-3.10 C3A

48 / 48 points

Due: 03/30/2023, 11:59 PM EST

48 / 48 points submitted to Blackboard.exam

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Completion details