

Computational Thinking with Python – Preliminary Quiz

You can complete the following questions in Python, JavaScript or other programming language.

1. Please create an array to tally integers between 0 – 4 and then create a counter controlled loop to input 20 integers from the user.
 - For each input between 0 and 4, increment the appropriate count in the tally array.
 - Inputs outside this range will be ignored.

After the inputs are complete, output a table with the values and their counts. Instead of outputting the count values, please output the corresponding number of # symbols in order to form a histogram as the example below.

Value	Count
0	##
1	#
2	#####
3	#####
4	####

2. Two common scales of temperature measurement are Celsius and Fahrenheit. To convert one to the other the following formulae can be used.

$$\text{celsius} = (\text{fahrenheit} - 32.0) * 5.0 / 9.0$$

$$\text{fahrenheit} = \text{celsius} * 9.0 / 5.0 + 32.0$$

Write a function called `convert` that will take two arguments: the temperature to be converted and the `targetScale` to convert to. The `targetScale` could be expressed in either upper or lower case. If the `targetScale` is 'c', the temperature should be converted from Fahrenheit to Celsius. If the `targetScale` is 'f' then the temperature should be converted from Celsius to Fahrenheit. If no `targetScale` is supplied the default target is Celsius. If a `targetScale` is supplied, but it is not 'c' or 'f', then a value of 0 should be returned. Your function should have a single exit point.

Q1. Solution in Javascript:

```
<script>
    INPUT_NUM = 20;
    MIN = 0;
    MAX = 4;

    var tally = new Array();
    var input = 0;
    var output = "";
    var i = 0;

    for(i=MIN-MIN; i<=MAX-MIN; i++){
        tally[i] = 0;
    }

    for(i=0; i<INPUT_NUM; i++){
        input = parseInt(prompt('Enter a number (' + MIN + '-' + MAX + ')'));
        while(isNaN(input) || input>MAX || input<MIN){
            input = parseInt(prompt('Reenter a valid number ('
                + MIN + '-' + MAX + ')'));
        }
        tally[input]++;
    }

    output += '<table border="1">';
    output += '<tr><th>Value</th><th>Count</th></tr>';
    for(i=0; i<tally.length; i++){
        output += '<tr><td>' + (i+MIN) + '</td><td>';
        for(var j=0; j<tally[i]; j++){
            output += '#';
        }
        output += '</td></tr>';
    }

    output += '</table>';
    document.writeln(output);
</script>
```

Q2. Solution in Javascript:

```
function convert(temperature, targetScale){
    if(targetScale == undefined)
        targetScale = 'c';
    if(targetScale.toLowerCase()=='c'){
        temperature=(temperature-32.0)*5.0/9.0;
    }else if(targetScale.toLowerCase()=='f'){
        temperature = temperature*9.0/5.0 + 32.0;
    }else{
        temperature = 0;
    }
    return temperature;
}
```