Homework 1

From Lab 1:

- Hash function (10 pts)
- Decimal to binary (10 pts)

From Lab2:

- Hanging cable (10 pts)
- Perfect triangle (10 pts)

From Lab3:

- Hailstone sequence (15 pts)
- Invoice printer (15 pts)

From Lab 4:

- Pascal’s triangle (15 pts)
  Note: Storing the triangle as a list of lists (before printing) and the algorithm used to generate the numbers are a requirements of the solution. A substantial grade penalty will be applied, if these requirements are not met.

Histogram problem from lab 4 with functions:

(15 pts)

Input:

Implement the function `getStudentScores()` where your program prompts for space-separated integer scores in the range `[0 .. 100]`, reads and ignores (discards) any invalid value (wrong type or out-of-range). The function, then, returns the valid scores as a list of integers.

Computation:

Implement a function `generateHistorgram(scores)` which, given the list of scores as argument, counts how many scores are in each of the ranges `[0, 9]`, `[10, 19]`, `[20, 29]`, `[30, 39]`, `[40, 49]`, `[50, 59]`, `[60, 69]`, `[70, 79]`, `[80, 89]`, `[90, 99]` and `[100, 100]` and stores these counts in a list, where each element corresponds to a range. The function, then, returns the list of counts (i.e. the histogram data)

Algorithm:

To compute the count of scores in each range, you can create a list (say `histogram`) of 11 integers, all initialized to zero. Then, loop through the list of scores, incrementing `histogram` elements, such that `histogram[i]` corresponds to the count of scores in the range `[10*i, 10*i+9]`. For example, if the score is 84 then `histogram[8]` should be incremented.

Output:

Implement the function `printHistogram(data)` which prints t the console 11 lines, each one starts with a range (in increasing order) and then a number of dashes corresponding to the number of scores within that range. Refer to the sample run for illustration of the output format.

In the main script, make the proper function calls to prompts the user for a set of student scores then produce and print a histogram of those scores.

```
This program produces a histogram of a set of scores (all between 0 and 100).
Please provide all the scores space-separated (invalid scores will be
ignored): 25 99 45 100 92 3 28 100 a 74 42 55 62 98 100 93 101 81 72 58 63.5
94 71 96 93
[ 0,  9]: -
[10, 19]:
[20, 29]: --
[30, 39]:
[40, 49]: --
[50, 59]: --
[60, 69]: -
[70, 79]: ---
[80, 89]: -
[90, 99]: -------
[   100]: ---
```