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TP08
Midterm (3.A)

TP08.1. Sequence of numbers down and up

Write program in Java that ask user to input positive number from keyboard and display numbers from inputted number down to 1 then back up to inputted number. For example:

```
Input positive number: 12b
Input only positive number: -7
Input positive number: 9
09 08 07 06 05 04 03 02 01 02 03 04 05 06 07 08 09
```

Note: As you can see in above example you need to check all possible cases including Not-A-Number and Number less than 1.

TP08.2. Cost calculation

A grocery shop has special promotion for their guests as a New Year gift. The promotion is based on how much customer buy the products. The conditions are listed below:

- Discount 5% if bought from 10$ and less than 30$
- Discount 10% if bought from 30$ and less than 80$
- Discount 15% if bought from 80$ and less than 150$
- Discount 20% if bought from 150$ and less than 300$
- Discount 25% if bought from 300$ and above

Create a class to encapsulate all logic related to cost, discount, and total price in this shop. (All fields must be private; methods and constructors can be public)

Write a program to calculate how much money a customer needed to pay due to given amount of buy (cost).

Example 1:

```
Input total buying cost: 35$
Input total buying cost: -30
Cost must be positive.
Input total buying cost: 10

     Total cost:    10.00 $
       Discount:       05 %
  Total discount:     0.50 $
_____

  Total payment:     9.50 $
```

Note: you need to check invalid inputs like 35$ is not valid because we accept only real numbers. The -30 is not valid because cost can't be negative.

Example 2:

```
Input total buying cost: 85

    Total cost:    85.00 $
      Discount:       15 %
Total discount:    12.75 $
_____

  Total payment:    72.25 $
```

Example 3:

```
Input total buying cost: 5

    Total cost:     5.00 $
Total discount:     0.00 $
_____

  Total payment:     5.00 $
```

Note: the 3rd example the total buying cost is less than $10, so they get 0 discount.

TP08.3. Rescue the Queen

Create a Java game follow the story as below:

"Once upon a time, there is a beautiful princess living in harmony in a pretty kingdom. One day, there is a black wizard captured the princess. A hero of such a game should answer the questions and take decisions that influence game result."

Your task is to propose a hero action option and depending on his choice to build a situation. The hero must pass the 3 tests of honor to rescue the princess. The 3 questions are listed below:

Questions	Result
Q1. You are on a horse in the way to rescue the princess, you face the first trial, here it is a small river. Next to it there are boat and a raft. Which one will you take? (A. Boat, B. Raft)	A. You took the boat and successfully crossed the river B. You took the raft, and it breaks in the middle of river because of the sharp rocks. Game over!!
Q2. (Only if pass Q1) You pass into a dark jungle. In the jungle, you face the second trial, the road is broken into two 2 ways: Rocky Road and Muddy Road. Which road will you take? (A. Rocky Road, B. Muddy Road)	A. The Rocky Road is a little hard to travel but you successfully crossed it B. The Muddy Road absorbed both the horse and you. Game over!!
Q3. (Only if pass Q2) You reach temple, you enter the temple. A person is attacking by a dragon! To move further, not paying to them of attention? (A. Yes, B. No)	A. You try to pass past, but the dragon notices your presence and transforms you into ashes. You are dead!!! GAME is over!!! B. Congratulation, you have passed all tests of honor. Princess gets to you!!! (Hero becomes the future king)

Make sure that each Question is an object of a class. Question should have question text, possible answers, correction answer, and may have method to check answer. You can suggest other structure if you like to.