Problem 4

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function: tan(x)
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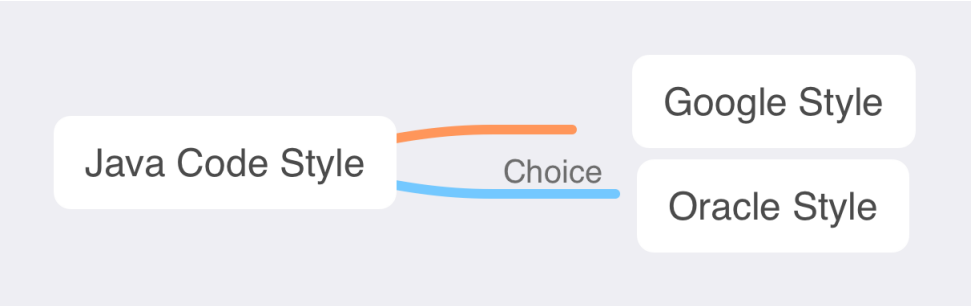
1 Description

tan1.java and tan2.java are based on Code Conventions for the Java TM Programming Language.[1]

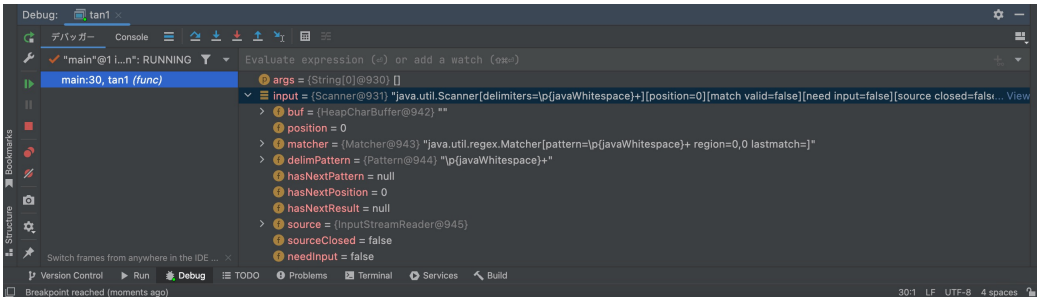
1.1 Mindmap for Java style



1.2 error handling

Both tan1.jar and tan2.jar offer error handling. If the user type something that is not a single real number, both programs will return the message "Please input numbers only!"

1.3 Debugger



- advantages:by setting breakpoints at any statement where the user wants to set, the debugger(in the picture means debugger :https://www.linguee.com/japanese-english/translation/.html) help the user identify the status of the variables, and continue the program sentence by sentence to observe the change of the variables.
- disadvantages: not new users friendly. The user needs to set breakpoints to use the debugger completely. No response if there is no breakpoint, there should be information telling the user to set. Besides, the debugger is hard to help if the execution is stopped inside an invariant.

1.4 code characteristics

correct:99 percent accuracy. robust:check if the input is right. time-efficient:use a hard-coded formula. usable:can compute tan(x) with 0.01

2 optimization of code

- Space-efficient: in tan1.java, the function that calculates x power y was coded in a simple function pw (from Line 8 to Line 18 in tan1.java), which makes the code of power function re-usable.
- Portable: there are only 57 lines of code in tan1.java and 35 in tan2.java.
- Maintainable: tan1.java uses the taylor serie to calculate the $tan(x)$ while tan2 uses $tan(0.01)$ as the base value to calculate the $tan(x)$. They can be edited by just changing the formula in tan1.java or the base value in tan2.java

3 optimization of program

- correct:in problem5.pdf, it turned out tan2.jar has 100% accuracy on the test cases.
- robust: both tan1.jar and tan2.jar offer error handling. If the user doesn't input a real number, the program will return the error message "Please input numbers only!"
- time-efficient: for each test case the time costed on calculating is under 0.2 second.
- usable: both tan1.jar and tan2.jar can be run on any device that supports JRE(Java Runtime Environment).

4 Checkstyle

description: Checkstyle snapshot of my tan(x) function source code.

advantages:Some information is useful for making my source code more easily readable. Like avoiding using ".*"form of import and add whitespace between variables and symbols.

disadvantages: It lacks categories like "spaces", ïndentation". Using categories can help the user identify his/her problems quickly.

Referenties

[1] Oracle, Code Conventions for the Java TM Programming Language, https://www.oracle.com/java/technologies/javase/codeconventions-contents.html, 1999.