

## 1 Error & Exception Handling

- Error management makes it possible to gracefully handle both hardware and software problems and enables interrupted execution to continue. Either the programmer creates the necessary codes to handle problems or uses software tools to handle errors when it comes to error handling in software. When mistakes cannot be categorised, they are typically handled by returning unique error codes. For some applications, there exist specialised programs called error handlers that can assist in handling errors. These programs can foresee errors, assisting in recovery without actually terminating the program.
- Responding to undesirable or unexpected events that occur while a computer program is running is known as exception handling. Without this process, exceptions would interfere with a program's regular functioning and cause it to crash. Exception handling deals with these events to prevent this from happening.
- In the given source code to find standard deviation, all the error and exception handling have been taken care of. To summarize a few exception handling errors,
  1. User cannot enter string as input.
  2. If while entering the numerical data values, user enters a string by error then he/she will be prompted to enter the number again at that index value.
  3. User will need to re-enter the size of the array if it is 0.
  4. User should enter at-least two numbers, in order to find Standard Deviation.
  5. If all the elements of the array are same then it should given output as 0.

## 2 Debugger

Debugging let you run a program interactively while keeping an eye on the variables and source code as they are being used. A break point in the source code indicates when the program's execution should halt while being fixed. Once the program has been paused, variables can be examined, their contents can be changed, etc. You can launch a Java program in Debug mode using Eclipse. Eclipse has a Debug viewpoint that offers you a ready-made selection of views. And through debug commands, Eclipse enables you to manage the execution flow.

### 2.1 Advantages of debugger

- Debugging helps in solving the unknown problems in the code For example, compile time and run time exceptions.
- We can step into and out of the Eclipse debugger and check the dependencies of other variables with regard to the currently skipped variable.
- Debugging is a very useful tools for inspecting the state of the objects and variables in your code at run time.

### 2.2 Disadvantages of debugger

- While in certain IDE's debuggers we can backtrack the debugger and examine its prior value, the Eclipse debugger does not allow us to do this.
- When multiple threads are active at once, debuggers frequently become stuck and refuse to advance.

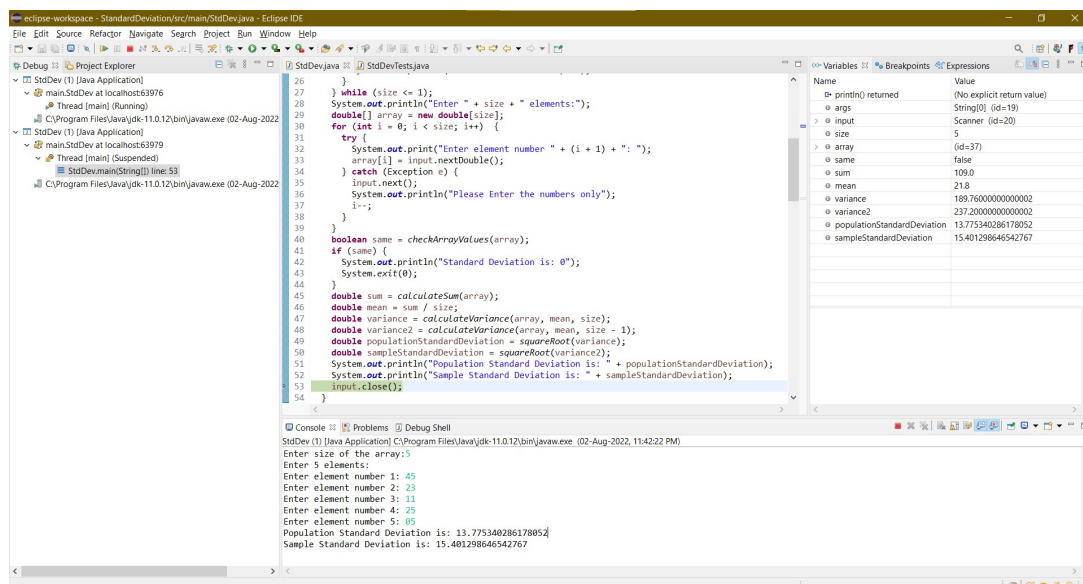


Figure 1: Debugger in use

## 3 Checkstyle

Programmers can use Checkstyle as a development tool to write Java code that follows a coding standard. To relieve humans of this tedious work, it automates the process of checking Java code. It is therefore perfect for initiatives that aim to impose a coding standard. It may examine a variety of elements in your source code. It can identify issues with class and method design. It can also check for formatting and code layout problems.

### 3.1 Advantages of Checkstyle

- Portable between IDEs [Eclipse And IntelliJ]
- Due to the fact that check style was truly intended to be an independent framework, integrating it with your external tools is considerably simpler.
- It lets you format the code with respect to global standards.
- Ability of creating your own rules. Eclipse defines a large set of styles, but checkstyle has more, and you can add your own custom rules.

### 3.2 Disadvantages of Checkstyle

- Removes the ability to do any 'special-case' formatting where an alternate format would make code more readable.
- The checks done by checkstyle do not confirm the correctness or completeness of the code.
- It ties you into using IDEs which support exactly the reformatting features you need.

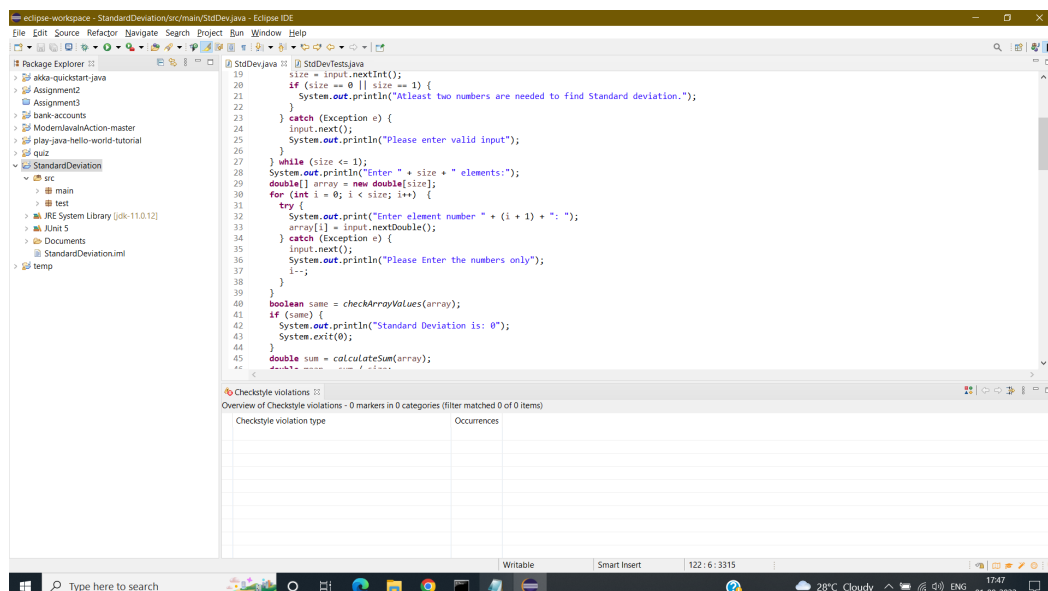


Figure 2: Checkstyle in use

## References

- [1] <https://www.techtarget.com/searchsoftwarequality/definition/error-handling>
- [2] <https://www.techopedia.com/definition/16626/error-handling>
- [3] <https://checkstyle.sourceforge.io/>
- [4] <https://softwareengineering.stackexchange.com/questions/92256/advantages-and-disadvantages-of-forced-code-reformat>