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There are two main types of testing for software, static testing and dynamic testing. Static testing is a process of examining the software without actually running it, including the code and design documentation. This helps to find syntax errors, design flaws, missing requirements, and logic flaws. Static testing is done through reviews, which can be formal or informal. Dynamic testing is a process of testing software by actually running it and checking the actual output against the expected output. There are two types of dynamic testing: white box testing and black box testing. White box testing is when you know the internal structure of what you're testing and are testing to improve design, security, or input/output. Black box testing is when you don’t know the internal structure and are just testing the software specifications and requirements.

There are several key differences between static and dynamic testing. The biggest one is that in static testing you don’t run the software, and in dynamic testing you do run the software. Another difference is that static testing can be done at any time, whereas dynamic testing can only be done after code is written. Actually, static testing should be done before the coding even starts to work out any major problems. Another difference is static testing is used more for design flaws, logic errors, and other defects that wouldn’t necessarily be picked up by dynamic testing, where dynamic testing is more for testing the functionality and verifying requirements after the fact. Basically, static testing is for preventing errors, and dynamic testing is for finding errors.

There are many reasons to use both static and dynamic testing. They both provide different perspectives on the software, with one focusing on design and the other on functionality, which complement each other nicely. Also, if you only used static testing, you would most likely miss a ton of errors, and if you only used dynamic testing, the software would most likely take a lot longer to produce. By using both, you streamline the design and coding process, and maybe the most important part, save a ton of time and money.