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Homework 9, ECE 590 & CS320 Software Reliability.

1. Please list (at least two) ways to deal with failures caused by Mandelbugs.

Restart and Reconfigure

2. Give a specific example of a non-aging-related Mandelbug where this action is likely to be successful and why.

Failure Description: If we are using a java based system to manage company files. During an upload, we upload a very huge file which exhausts the heap memory of the JVM and subsequently the program crashes.
Action: we can use **reconfigure** to deal with this problem. Just like mentioned in the class, reconfigure allows that we can increase memory and storage of a virtual machine at the system level, so we can change a larger heap memory to avoid the failure above. And after the reconfigure, we would reboot or restart. It would clean up our heap to free up more space for the Java JVM.

3. Give a specific example of an aging-related-bug where this action is likely to be successful and why.

Failure Description: When we use DCE for software development, if we develop a new function that will operate on memory areas. This can cause a shared linked list of memory to be corrupted under certain load conditions. This linked list causes the DCE to crash during subsequent accesses.
Action: We can use **reboot** the DCE to deal with this problem. This problem is due to the crash of shared linked list, and reboot would make the list initialize again. A new environment would make it run successfully.

Reference:

【1】 Grottke, Michael & Kim, Dan & Mansharamani, Rajesh & Nambiar, Manoj & Natella, Roberto & Trivedi, Kishor. (2016). Recovery From Software Failures Caused by Mandelbugs. IEEE Transactions on Reliability. 65. 70-87. 10.1109/TR.2015.2452933.

【2】 Trivedi, Kishor & Mansharamani, Rajesh & Kim, Dan & Grottke, Michael & Nambiar, Manoj. (2011). Recovery from Failures Due to Mandelbugs in IT Systems. IEEE Transactions on Reliability. 10.1109/PRDC.2011.34.