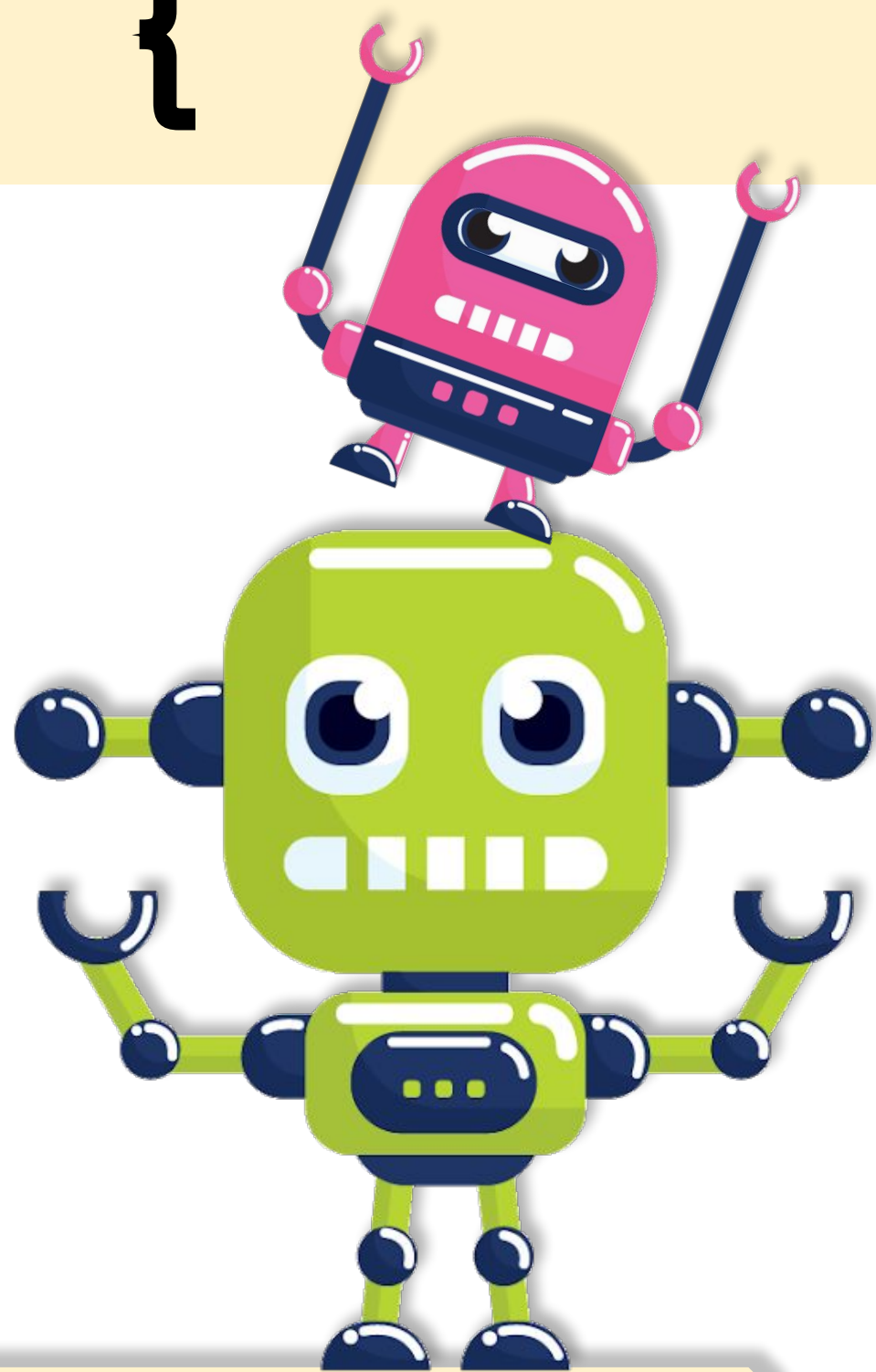# public class **TestAutomation** {

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abstract() {

We created a proof-of-concept of a critical step in the **Exploration Ground Infrastructure (EGI)** team's transition to a **DevOps** workflow, by automating manual tests that consume dozens of hours. With automated tests, minutes replace hours and the entire development process is streamlined.

objectives() {

❏ Reduce time needed for software testing by moving from manual to **automated testing**
❏ Accelerate the development process by modernizing to a **DevOps** work environment

toolsUsed() {

❏ **Selenium** is a framework that provides an automated browser that performs actions without human input
❏ **AssertJ** is a testing library for Java that provides simple, easy-to-read **assertions**, or true-false condition checks (e.g. "Is this text box present?")
❏ **Gauge** is a testing automation framework that provides clean, customizable test reports
❏ **TestNG** is a Java testing framework
❏ **ExtentReports** is an open source library for test automation
❏ **Log4J** is a logging tool that helps debug and track the status of the application
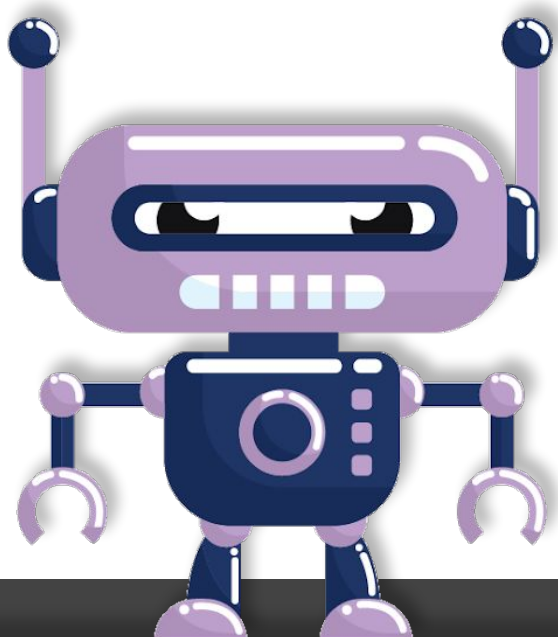
introduction() {

We worked in **Space Exploration** under **EGI**--essentially ground control for ISS operations.

❏ **COLDS** is an application that enables document sharing between NASA and the CSA
❏ **QBERT** is a database for MSS technical details
❏ **MOWA** is an application that updates QBERT with the latest operational workaround data
❏ **Activity Manager** is an application used by the EGI Ground Controller and Ground Administrator groups to schedule and manage activities in the MSS Operations Complex (MOC)
❏ **DevOps** combines software development (writing code) with IT operations (code deployment and support)
  ❏ **Continuous integration**: merging (in version control software) all developer working copies often to the main branch
  ❏ **Continuous delivery**: deploying software in short cycles by running code changes through automated testing
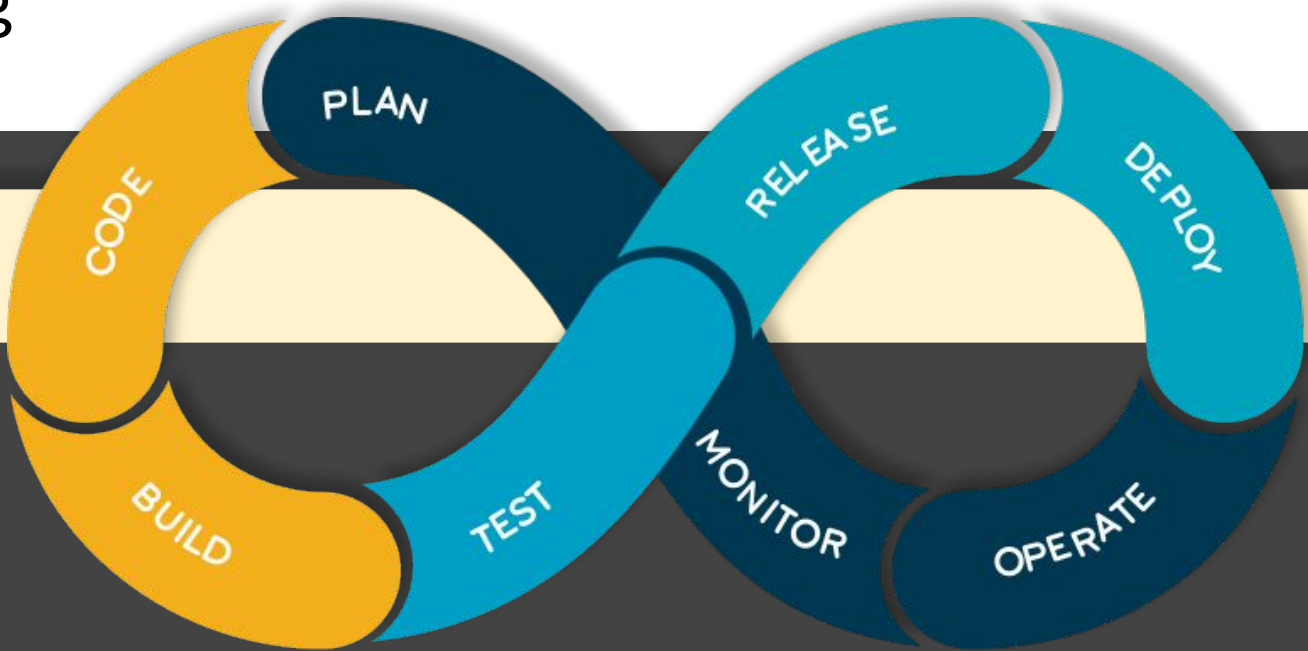
results() {

Total Time Spent Testing per Updated Version: MOWA
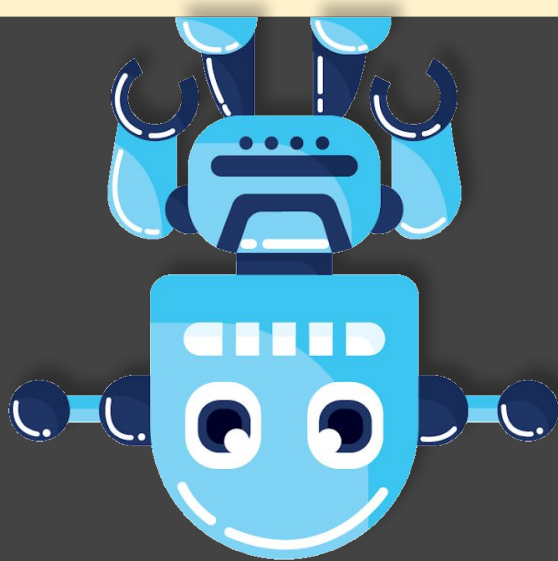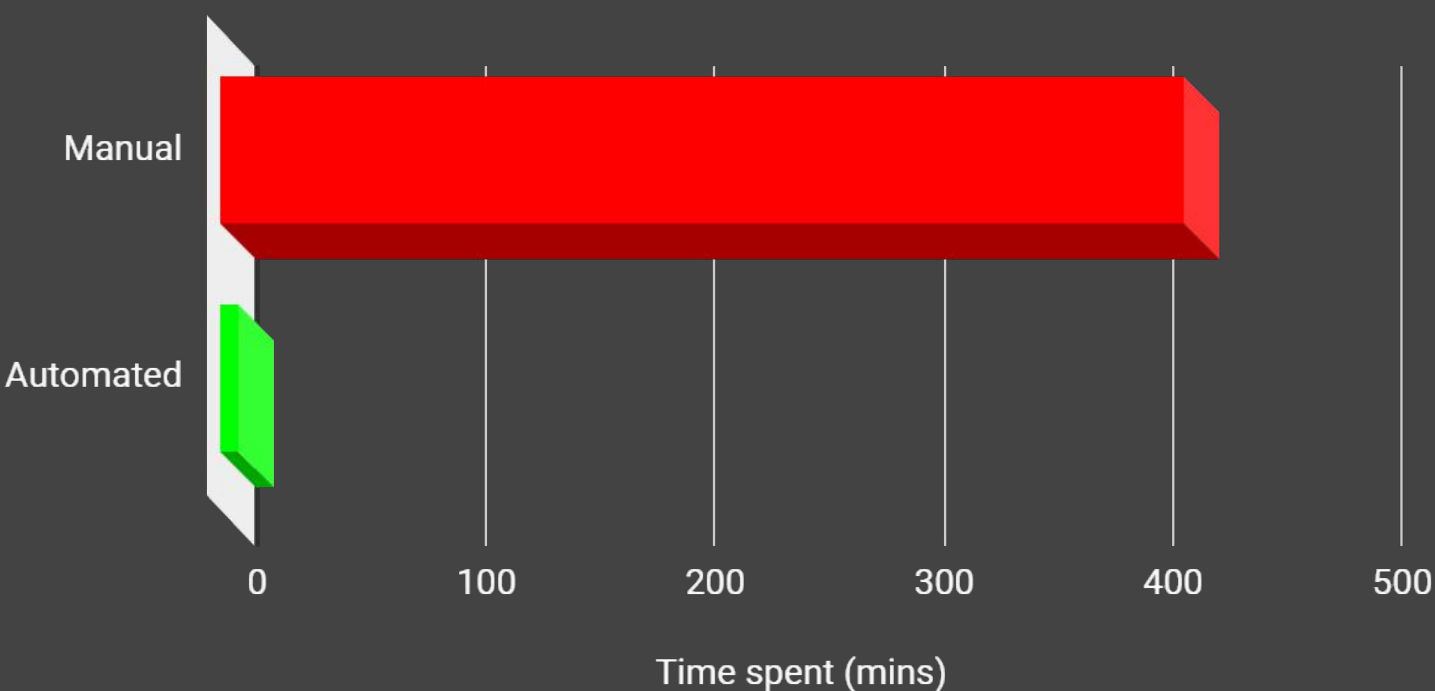
Based on an average of 5 commits per version. Unofficial tests are conducted for each commit, and official tests are conducted for each new version.

Manual test	Time spent	Automated test	Time spent
Unofficial dry run	60 x 5 = 300 min	Unofficial dry run	1 x 5 = 5 min
Official dry run	60 min	Official dry run	1 min
Official formal run	60 min	Official formal run	1 min
	7 hrs		7 min

Advantages of automated testing include:
❏ Automatic report generation
❏ Parallel test execution
❏ Smaller risk of human error
❏ Clear software use cases
❏ No technical knowledge required

conclusions() {

This internship was a great learning experience. Some of us are actively using Selenium and other automation tools in side projects, but overall, the CSA provided a stimulating, fast-paced learning environment that complemented our studies well.
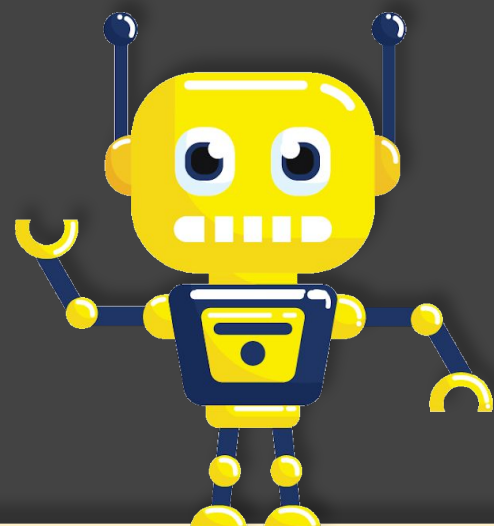
nextSteps() {

The remainder of EGI tools will be automated in the coming years. Automation, more generally, could be applied to:
❏ Database maintenance
❏ Ground control
❏ Testing after OS updates

References / Image Credits:
❏ *https://vecteezy.com*
❏ *http://debciuch.pl/senior-devops-engineer-administrator/*

acknowledgements() {