Spring Professional Exam Tutorial v5.0

Question 01

Question 01 - Do you use Spring in a unit test?

Spring Framework is usually not used in unit tests, however Spring contains some support for unit testing within following packages:

- `org.springframework.test.util`
  - `ReflectionTestUtils`
    - ORM Entities related testing – set value for private field, normally handled by ORM
    - Manual dependency injection into private field, normally handled by `@Autowired`, `@Inject`
    - `@PostConstruct` and `@PreDestroy` lifecycle callback methods testing
  - `AopTestUtils` – Aspect Oriented Programming Related Testing
- `org.springframework.test.web`
  - `ModelAndViewAssert` – Unit Testing for Spring MVC Controllers
- `org.springframework.mock.env`
  - mock implementations of the Environment and PropertySource
  - `MockEnvironment, MockPropertySource`
- `org.springframework.mock.jndi`
  - Mock implementation of JNDI SPI – usually used for Java EE
- `org.springframework.mock.web`
  - Servlet API mock objects

Question 01 - Do you use Spring in a unit test?

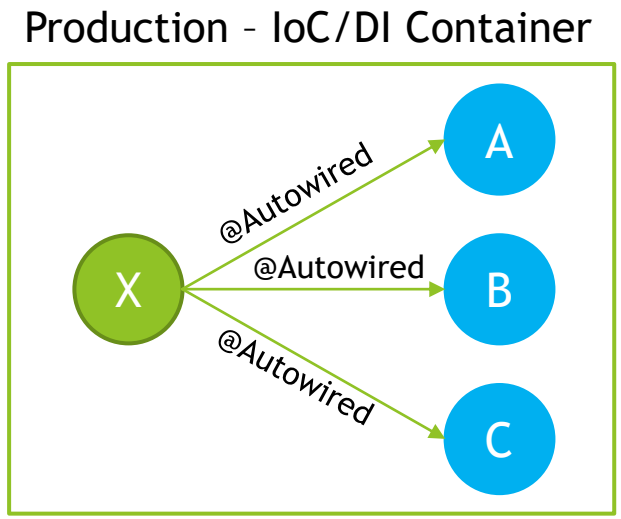
To get full understanding on why Spring is usually not used for unit tests, however some support for unit testing exists within framework, we need to get deeper into testing subject and understand differences between:

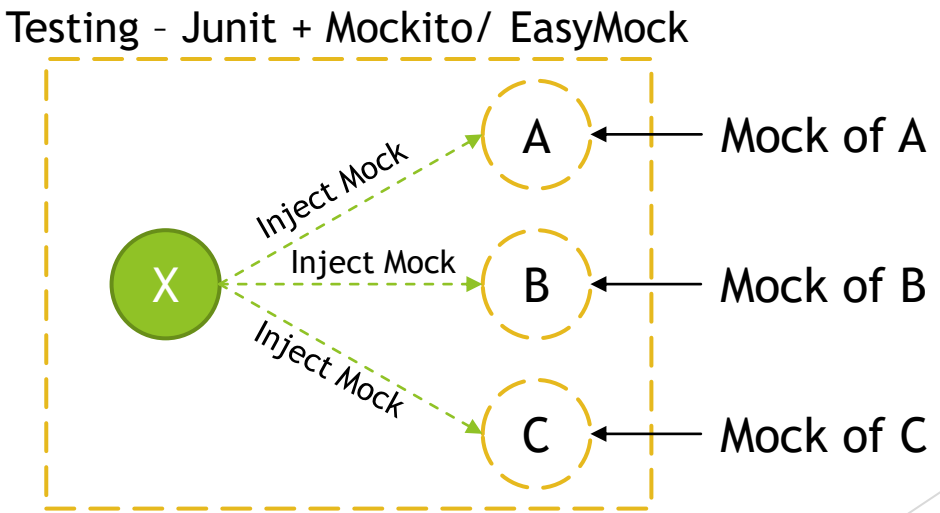
- Unit Tests
- Integration Tests
- System Tests

Having understanding on purpose and range of testing performed on each level will make it clear to know at which type of test Spring IoC/DI should be used and at which level only Spring Mocks should be used, without involving Spring IoC/DI.

Question 01 - Do you use Spring in a unit test?

Unit Tests should test one **unit of functionality** in **isolation**. This unit of functionality can be defined as **single** method, **class**, module, component. In **Object Oriented Programming**, **unit of functionality is usually defined as single class**. Testing in isolation, means that environment of execution is not initiated during testing and should not affect testing process, any dependencies on environment should be mocked. All **class collaborators should be mocked** as well. Testing should be performed **outside of container**, that means that **IoC/DI should not be required to create instances** of objects under test. Tests should execute successfully as out-of-container tests.

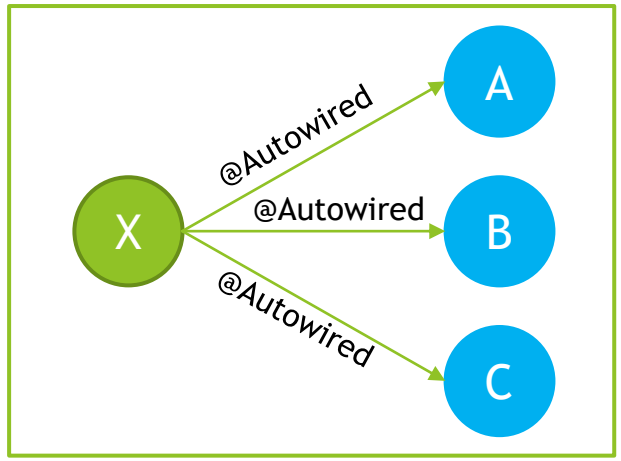




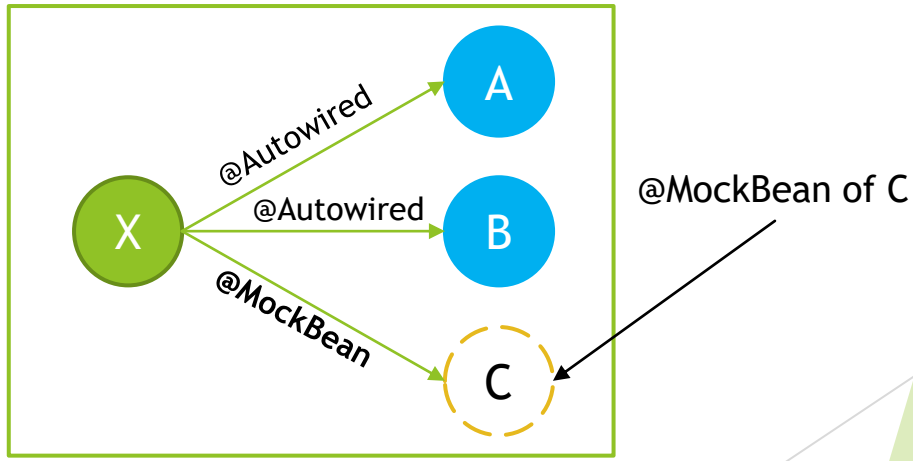
Question 01 - Do you use Spring in a unit test?

Integration Tests should test **multiple** modules or **components** that are **combined together**. Those modules should be already unit tested, and on Integration Test level some subset of functionalities should be checked, to test if modules provide requested functionalities when cooperating together under environment that should be close to production one, however with assumptions **that some of components might still be mocked**. When performing Integration Test we want to **initiate subset of system** and execute test against it. **IoC/DI Container is used** for this kind of testing, with some simplification upon deployment or container execution.

Production – IoC/DI Contianer

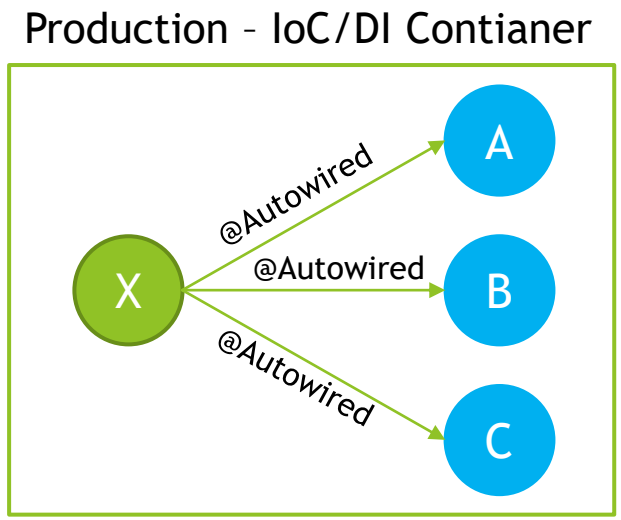


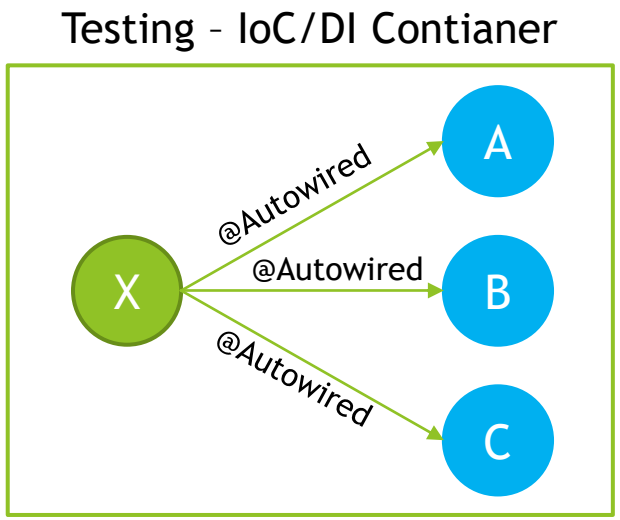
Integration Testing – @RunWith(SpringRunner.class)



Question 01 - Do you use Spring in a unit test?

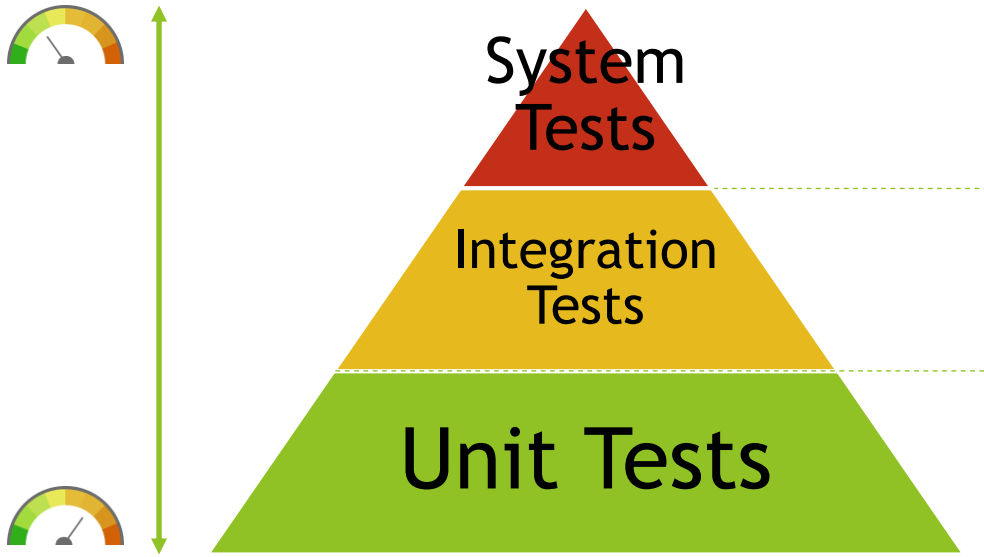
System Tests should check required system functionality on fully running system, consisting of all modules and environment that is as close as possible to production one. System under System Tests level should already be checked on unit and integration test level, and on System level only subset of functionalities should be checked to fill the gaps that were not possible to test on unit and integration testing level. **IoC/DI container is used** with assumption that it is used in **the same way as production environment**.





Question 01 - Do you use Spring in a unit test?

In practice, large scale enterprise systems needs to have testing strategy defined to test system that is being developed in efficient manner. Often used strategy for test automation is “Testing Pyramid”. It assumes that Unit, Integration and System Tests are implemented, with right ratio on number of tests on each level.



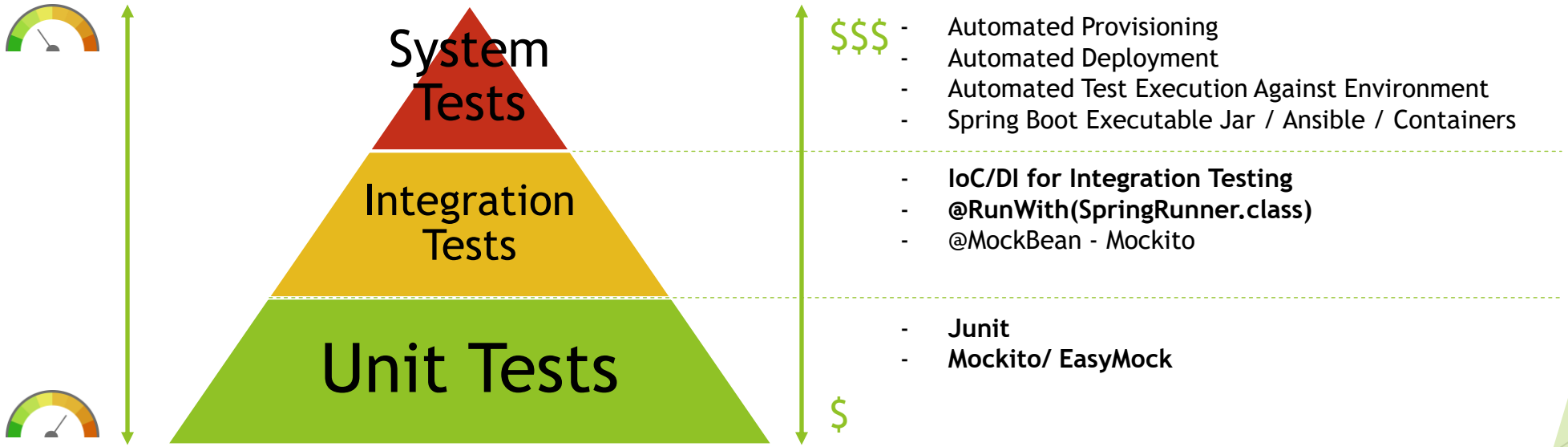
$$$
- **Execution:** Slow
- **Maintenance:** Expensive
- Easy to test System Cases
- Hard to test Detailed Cases

- **Execution:** Medium-to-Slow
- **Maintenance:** Medium-to-High cost
- Details testing is a challenge
- Easy to test Integration between components

$
- **Execution:** Fast
- **Maintenance:** Cheap
- Hard or impossible to test Integration/System Cases
- Easy to test Detailed Cases

Question 01 - Do you use Spring in a unit test?

On each level right set of tools should be used to perform testing, minimize costs and maximize feedback from automated tests.



Question 01 - Do you use Spring in a unit test?

In large scale projects, you need to have all types of tests implemented, as on each level you can look at different level of details of the system.