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MODEL-BASED TESTING OF 3D VIDEO GAMES

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Overview

- Issues with game testing
- Available methods for automated testing
- Testing of VR (Virtual Reality) Quiz used for museums
- Created testing framework
- Test results

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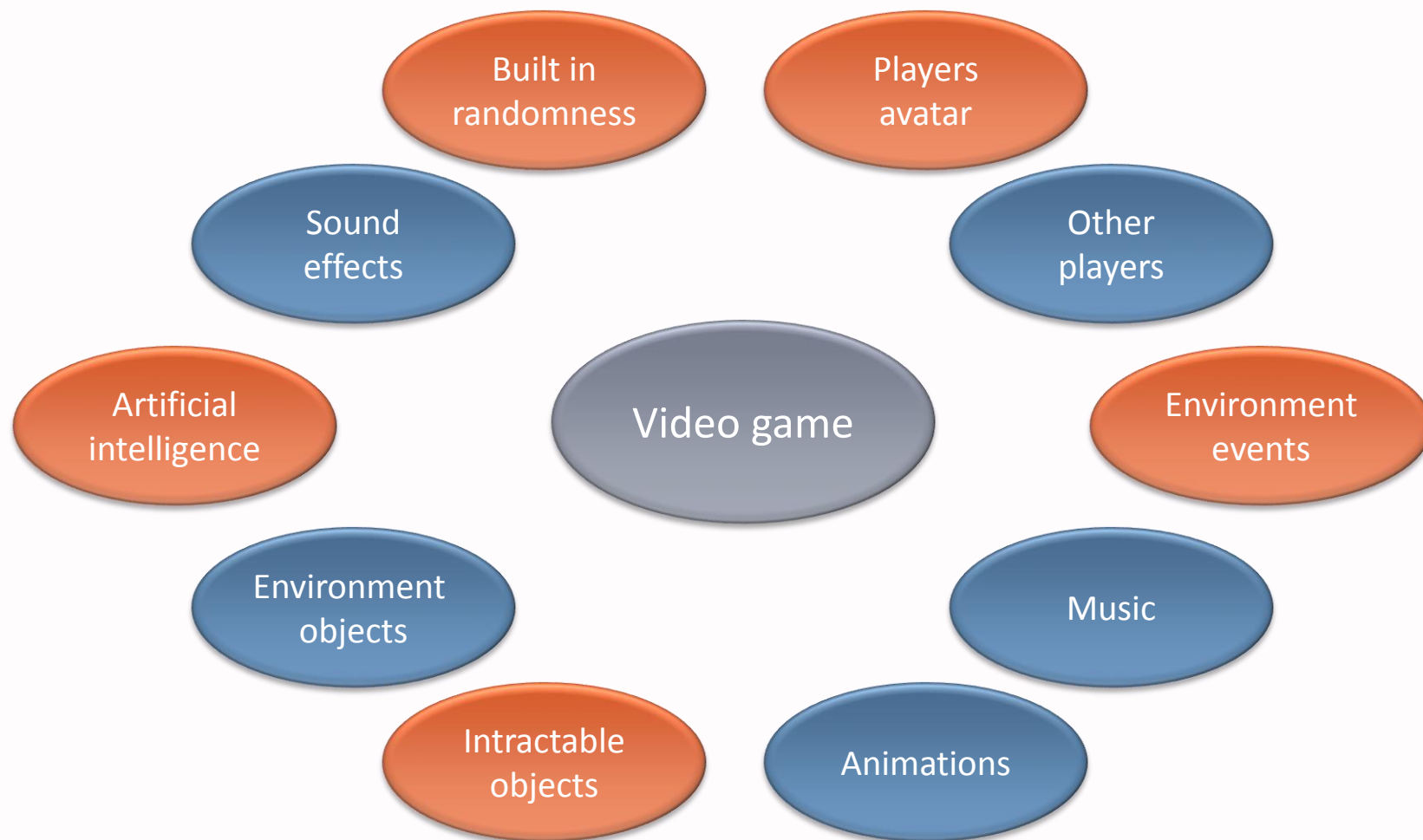


ISSUES WITH GAME TESTING

Alpha phase horrors

- The game is feature complete, but untested
- Systematic testing begins
- QA works overtime or hires additional staff
- Automated testing should alleviate this phase
- Tools should be usable when game is being developed

Pursuit of abstraction



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AVAILABLE METHODS FOR AUTOMATED TESTING OF GAMES

Available methods for automated testing of games

- Capture and replay
 - No abstraction
- Bots
 - No test oracle
 - Limited use
- Model-based testing
 - High coverage and abstraction
 - Maintainable

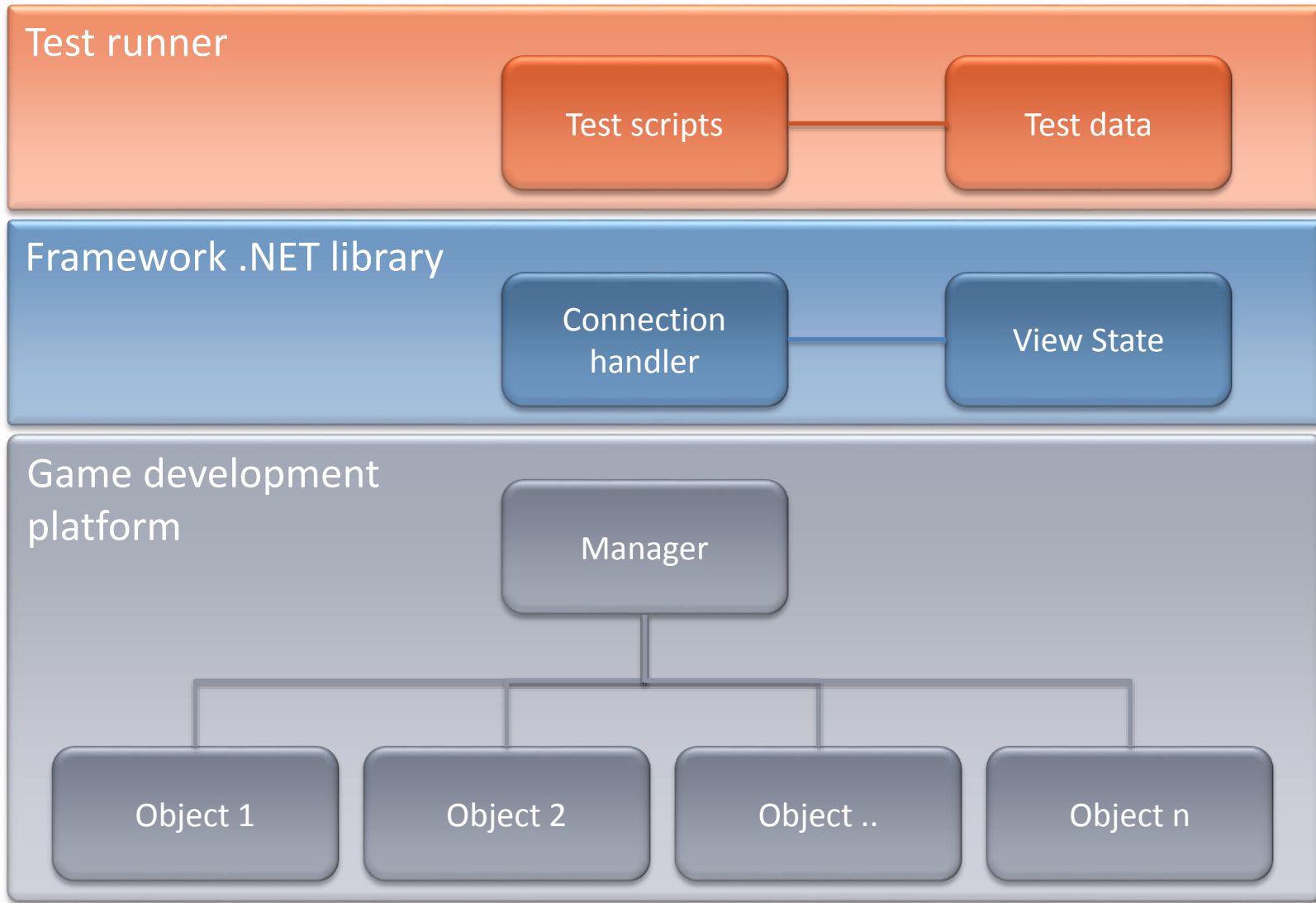
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TESTING OF VR QUIZ

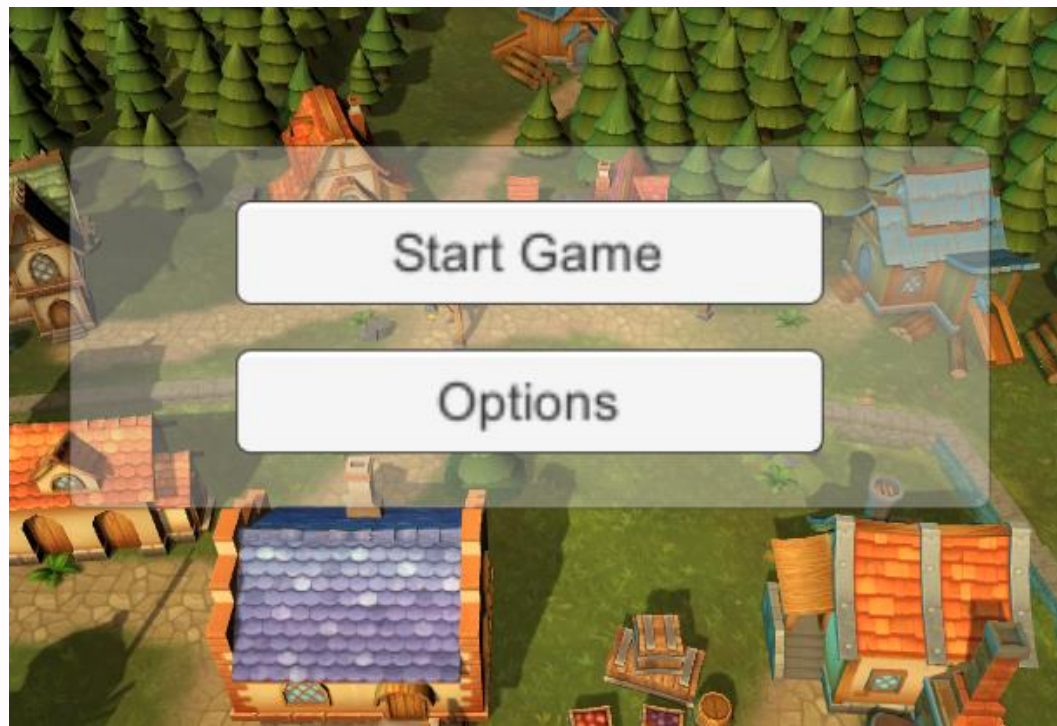
Testing framework

- Framework to control the behavior of a game
- Get the state of the game
- Usable with Unity®
- Can be used with methods other than MBT
- Open source
 - <https://gitlab.com/madis-taimre/TestingFramework.git>



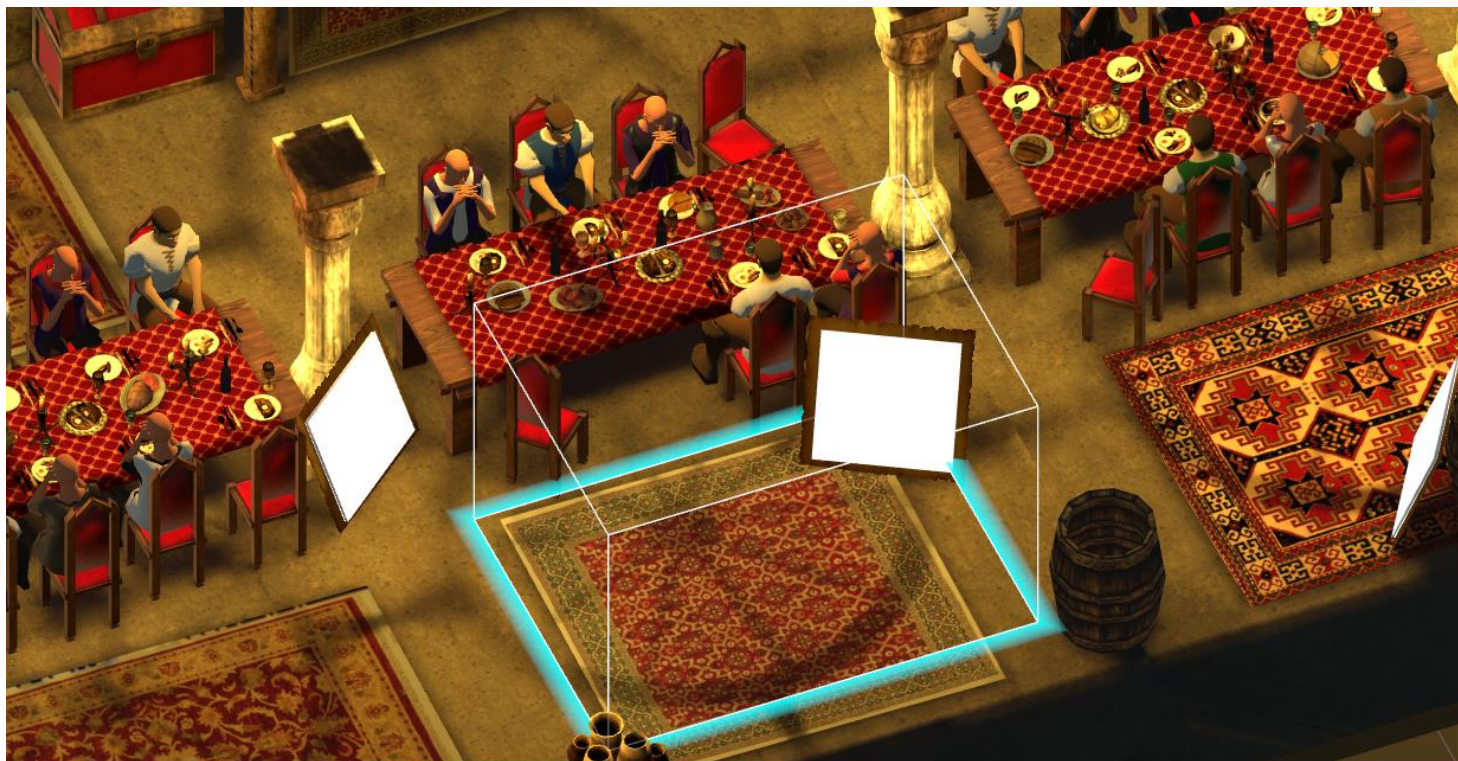
TestObject

- IsVisible
 - Active in hierarchy
 - Seeable by avatar
- GetParameter
 - Text
 - Indicator status
- Trigger
 - Button
 - Environment object



VR Quiz

- Virtual Reality
- Point and click interface
- 6 DOF for player



Testing with scripts

- Turn to object and check visibility
- Turn to object and click
- Checks the states of all object every time
 - Higher coverage

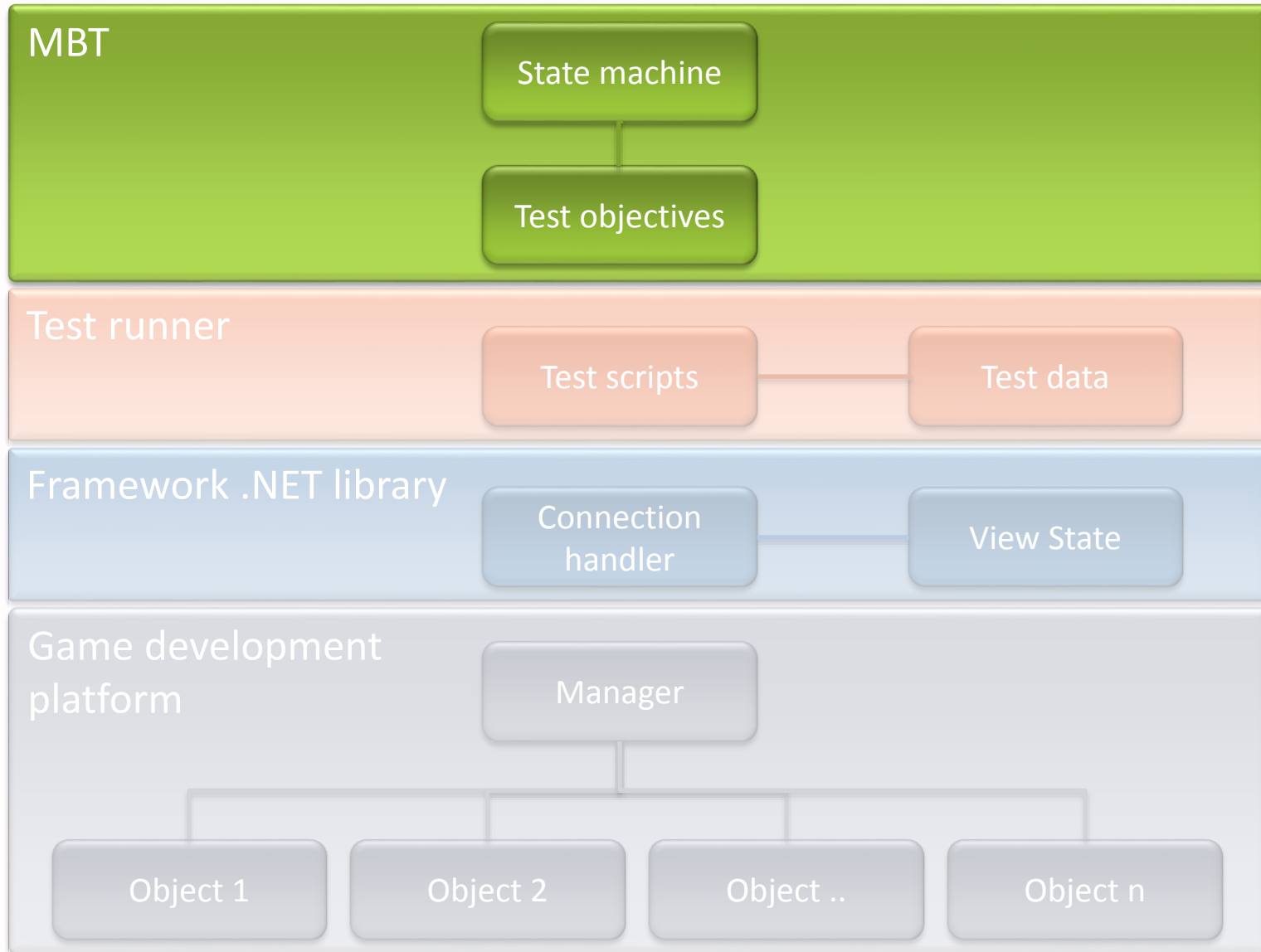
```
[TestMethod]
public void TestChooseImage1()
{
    CheckViewState(m_adapter.GetViewState(), Level1Data.ViewStates);

    m_adapter.TriggerButton(Level1Data.m_estonianPlaque);

    CheckViewState(m_adapter.GetViewState(), Level2Data.ViewStatesEstonianQuestion);

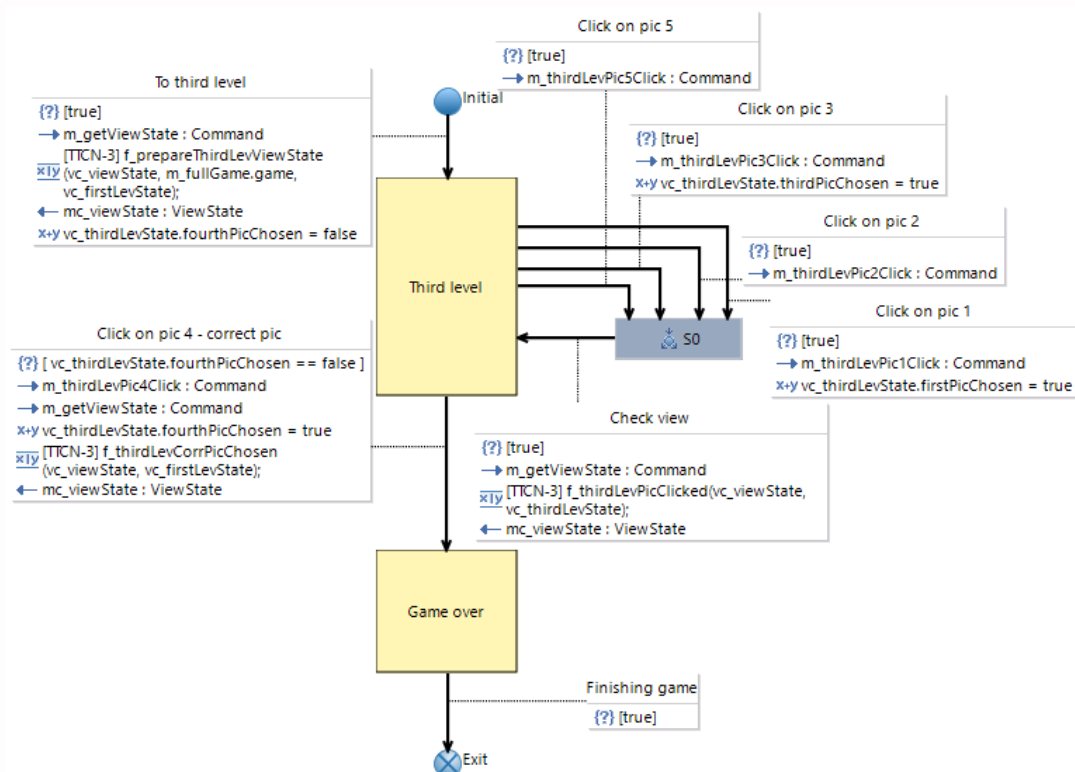
    m_adapter.TriggerButton(Level2Data.m_quizObject1);

    CheckViewState(m_adapter.GetViewState(), Level2Data.JailPosViewState);
}
```

Test results

- 64 % coverage
- Generated over 570 actions
- Found 4 major errors



Conclusion

- MBT offers high abstraction, which is needed for game testing
- By adding test scripts into a game, it is possible to test various game elements and interactions
- Successfully tested a 3D game using MBT and the created framework
 - <https://gitlab.com/madis-taimre/TestingFramework.git>

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THANK YOU FOR LISTENING