Challenges with Automation for Games

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Nice to meet you!

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What do we do?

- We are a company offering testing services
- We teach through our BBST courses
- We are building tools that help with test automation (AltTester®, AltWalker, AltTap)

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How about you?

- How familiar are you with game development?
- Have you implemented apps using Unity or other engines?
- What challenges did you face while testing the app?

Game testing world

Game World

- Game Engines (like Unity, Unreal, Custom Engines)
    - develop once, export to many platforms
    - a lot is common, but each platform has its own quirks

Traditional software development
vs.
Game software development

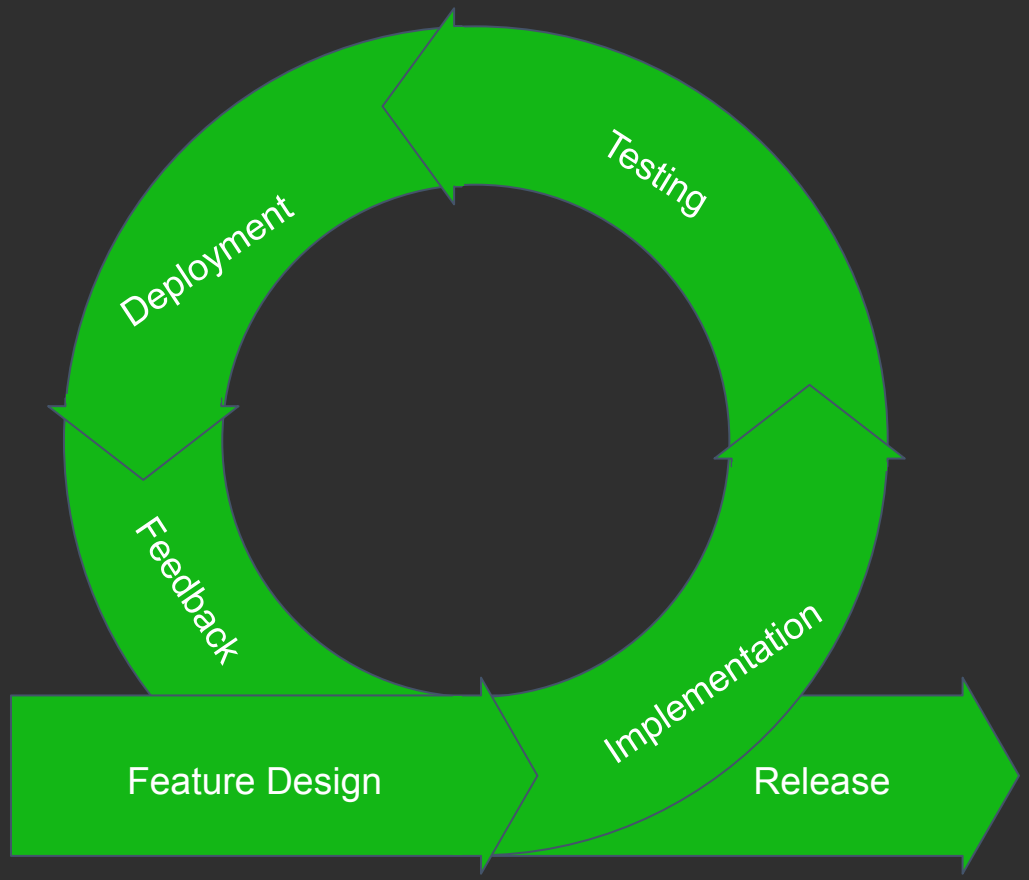
Traditional / Agile Software Development

- Every change in the code is tested
  - functional tests as automated scripts
  - give continuous feedback on how other parts of the software are affected by the change

Game Software Development

- QA team performs functional testing once features are completed
- Playtesting, Alpha testing, Beta testing

Traditional / Agile Software Development



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Challenges with non-automated approach

- Games are generally complex and testing all functionalities manually becomes too time consuming
- Games are frequently updated and you have to retest the same thing all over again
- You have to test the same functionalities on multiple platforms
- Make sure nothing broke from the existing features

Options for Game Test Automation

Many programming languages

Supports iOS and Android,
Mac, Windows

Offers great interaction with
the target platform

APPIUM

Testers who are familiar with
Selenium find it easy

Works with Browserstack, Bitbar Cloud,
AWS and other Device Cloud platforms

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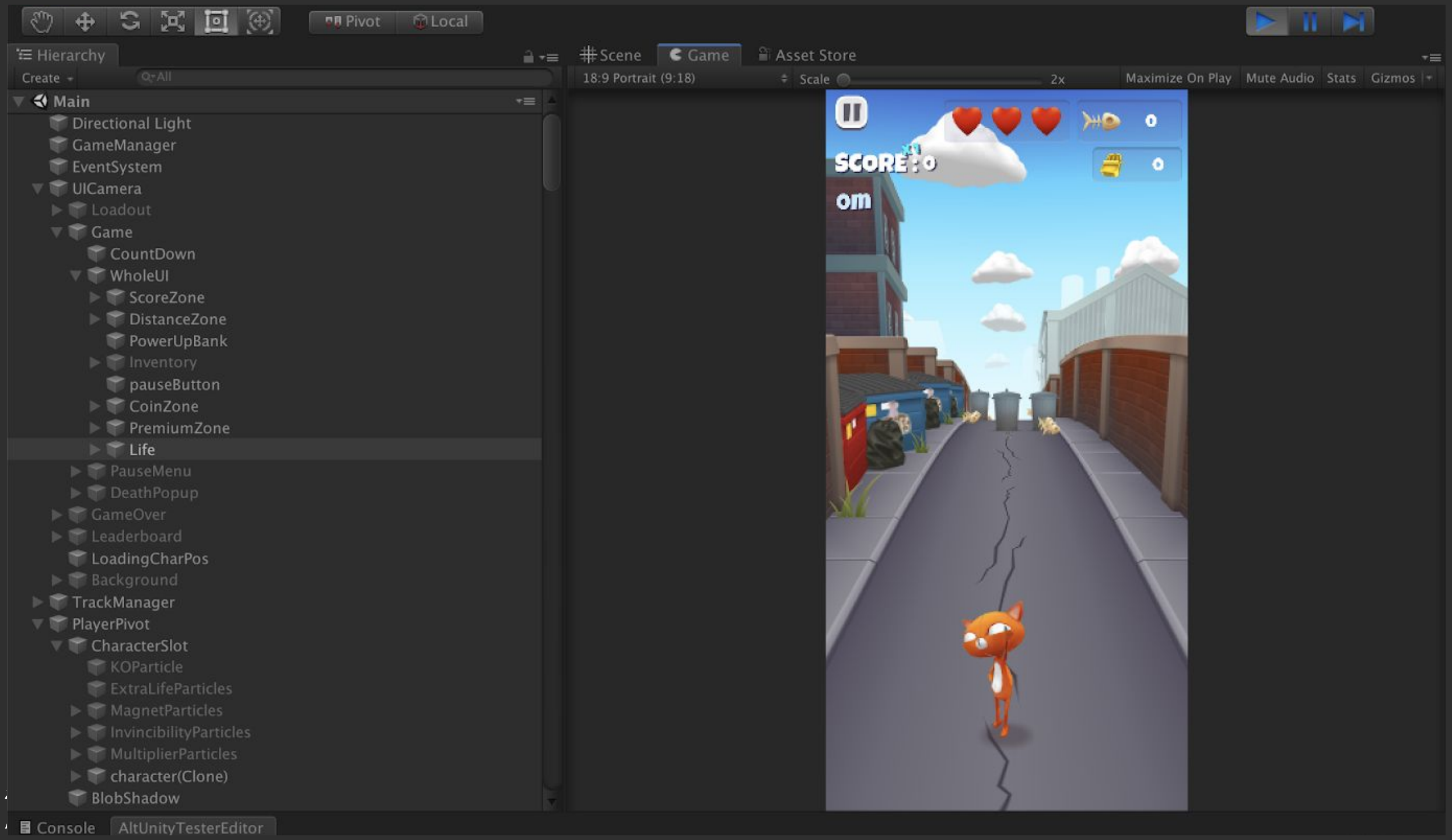
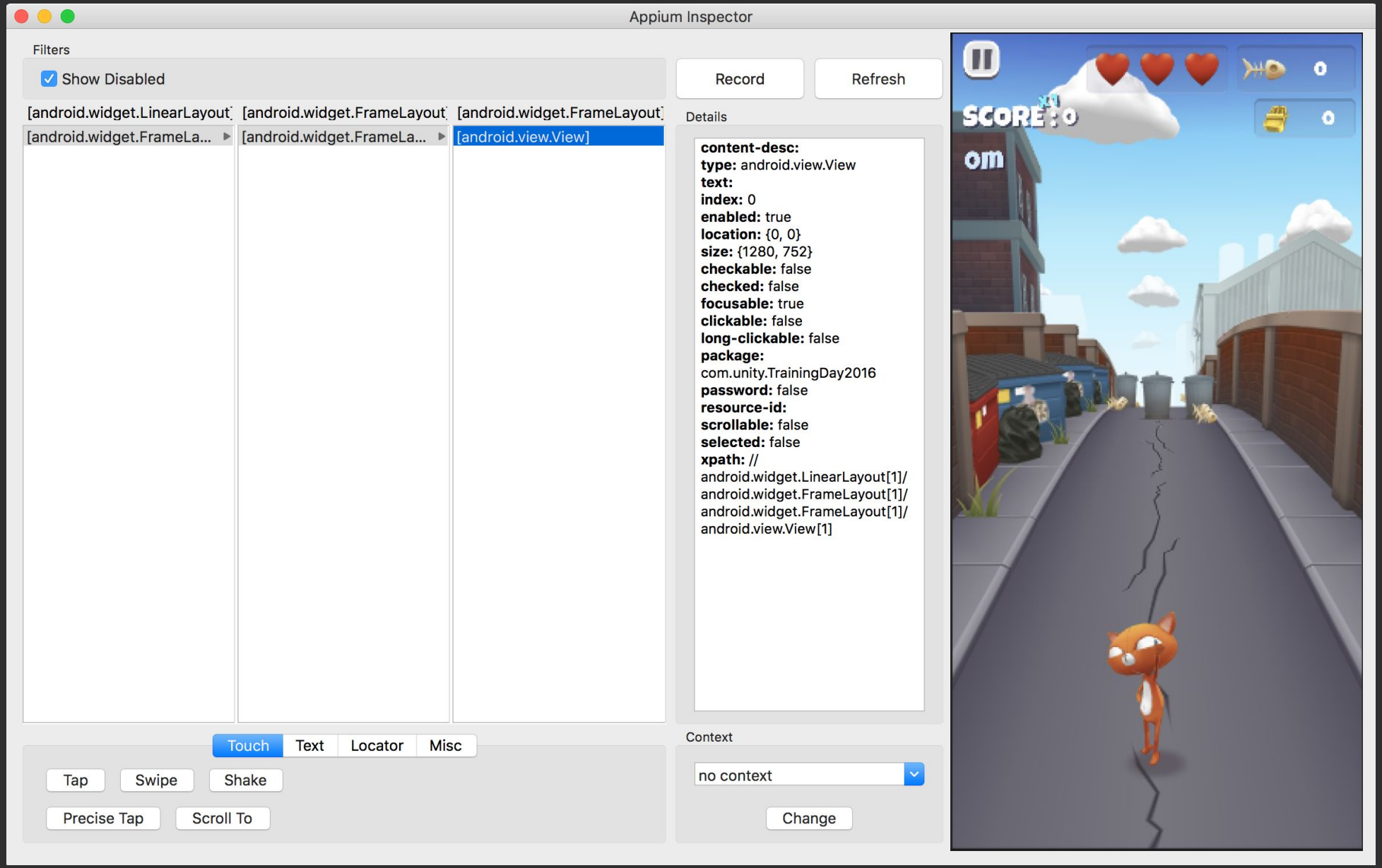

Pivot
Local
Hierarchy
Create
Main
Directional Light
GameManager
EventSystem
UICamera
Loadout
Game
CountDown
WholeUI
ScoreZone
DistanceZone
PowerUpBank
Inventory
pauseButton
CoinZone
PremiumZone
Life
PauseMenu
DeathPopup
GameOver
Leaderboard
LoadingCharPos
Background
TrackManager
PlayerPivot
CharacterSlot
KOParticle
ExtraLifeParticles
MagnetParticles
InvincibilityParticles
MultiplierParticles
character(Clone)
BlobShadow
Scene
Game
Asset Store
18:9 Portrait (9:18)
Scale
2x
Maximize On Play
Mute Audio
Stats
Gizmos
SCORE: 0
0
0
Console
AltUnityTesterEditor


Appium Inspector
Filters
Show Disabled
[android.widget.LinearLayout
[android.widget.FrameLayout
[android.widget.FrameLayout
[android.widget.FrameLa...
[android.widget.FrameLa...
[android.view.View]
Record
Refresh
Details
content-desc:
type: android.view.View
text:
index: 0
enabled: true
location: {0, 0}
size: {1280, 752}
checkable: false
checked: false
focusable: true
clickable: false
long-clickable: false
package:
com.unity.TrainingDay2016
password: false
resource-id:
scrollable: false
selected: false
xpath: //
android.widget.LinearLayout[1]/
android.widget.FrameLayout[1]/
android.widget.FrameLayout[1]/
android.view.View[1]
Touch
Text
Locator
Misc
Tap
Swipe
Shake
Precise Tap
Scroll To
Context
no context
Change
SCORE: 0
0
0

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~~Click at coordinates~~

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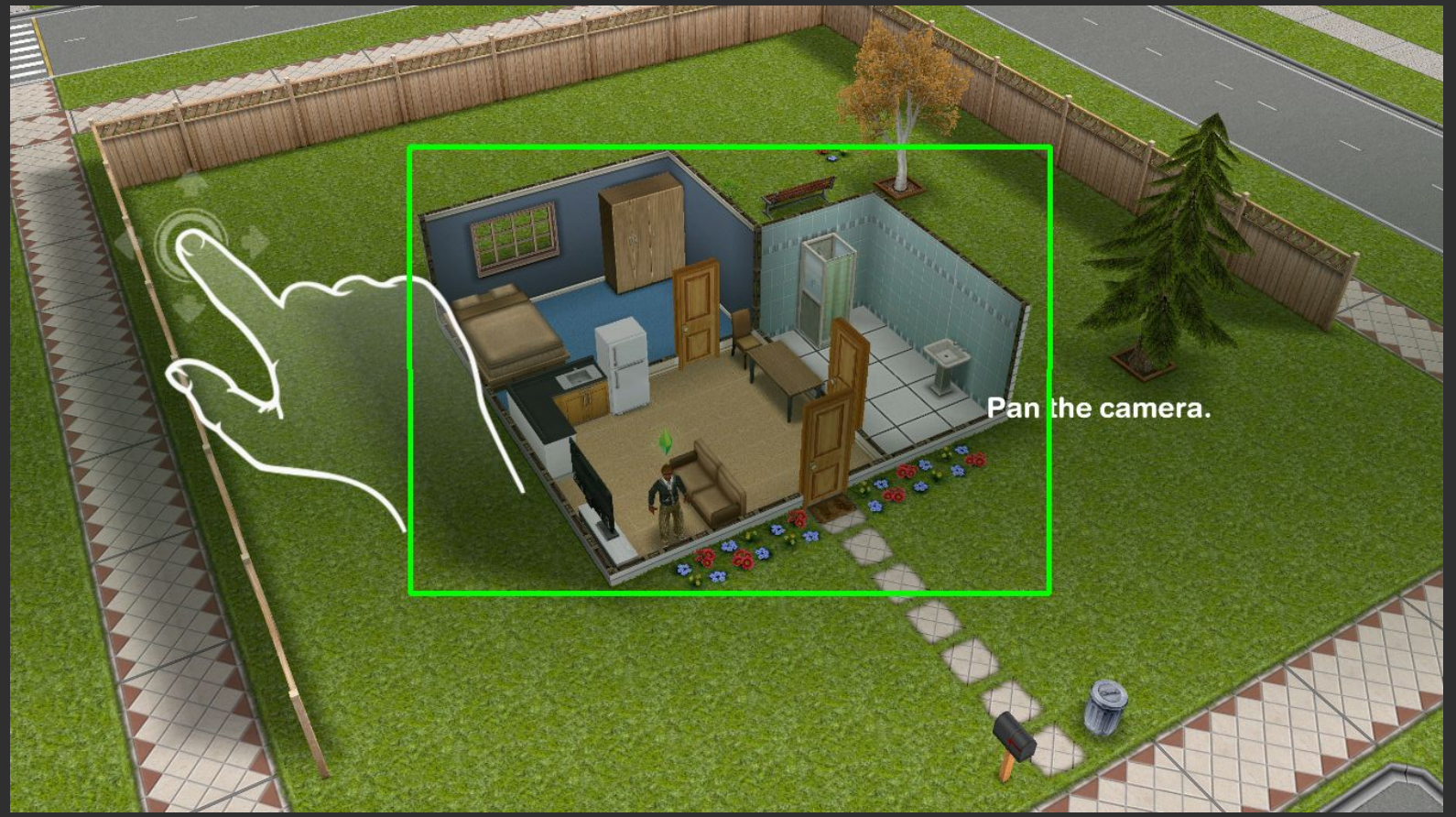
Image Recognition

Define “House” element using an image



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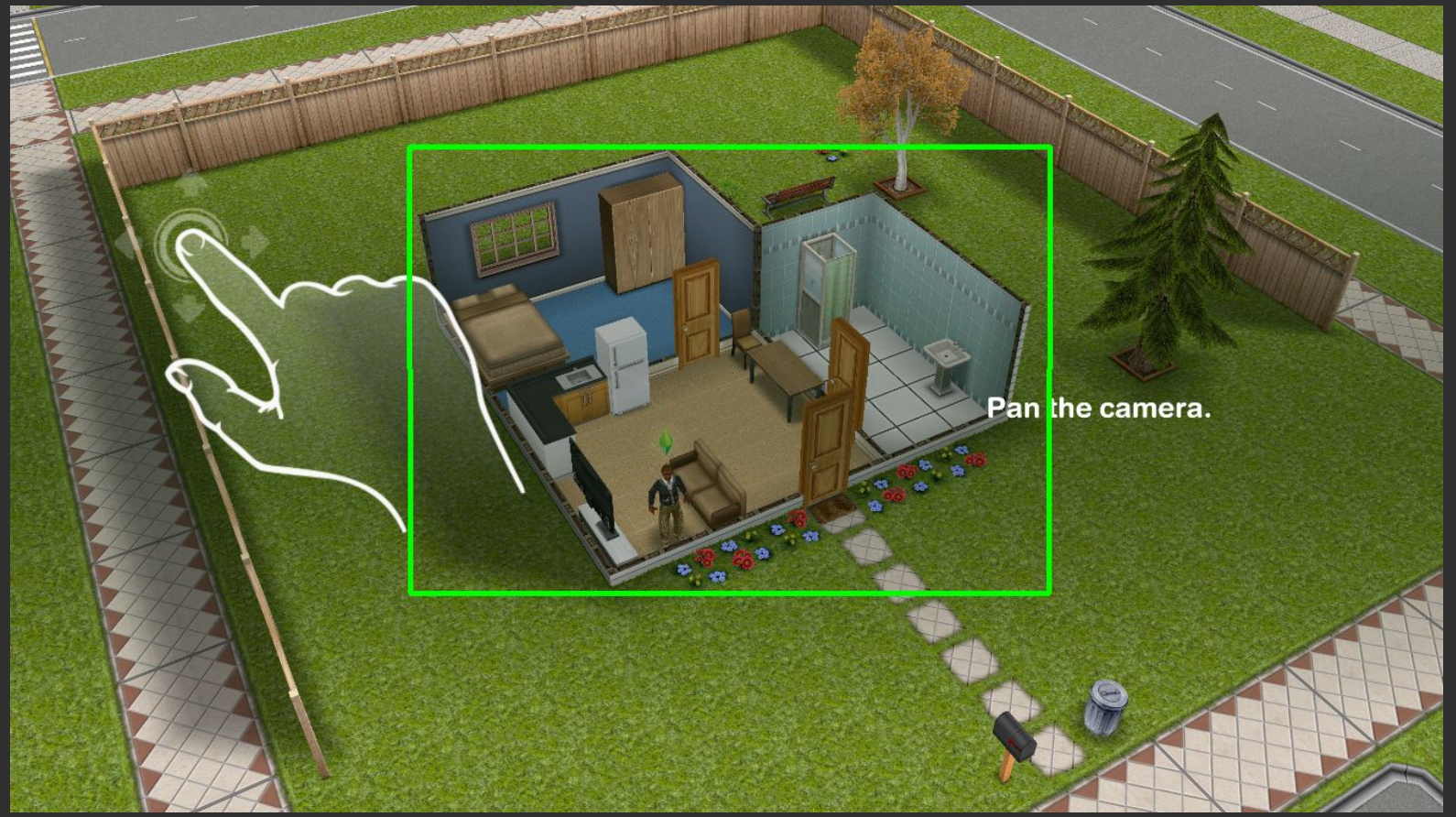

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OpenCV - Feature detection and matching

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OpenCV - Feature detection and matching

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OpenCV - Feature detection and matching

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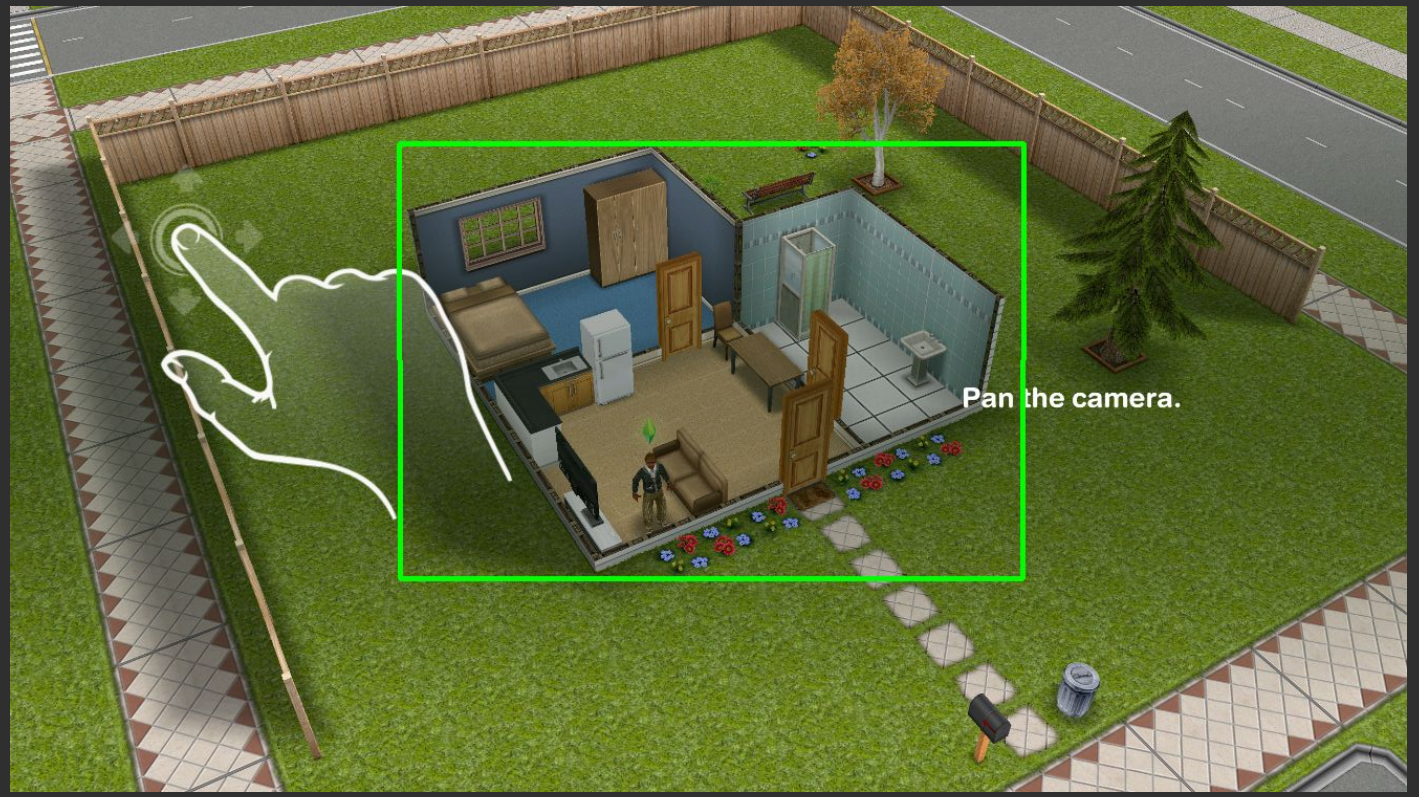
Resolution Agnostic, works rotated and stretched items



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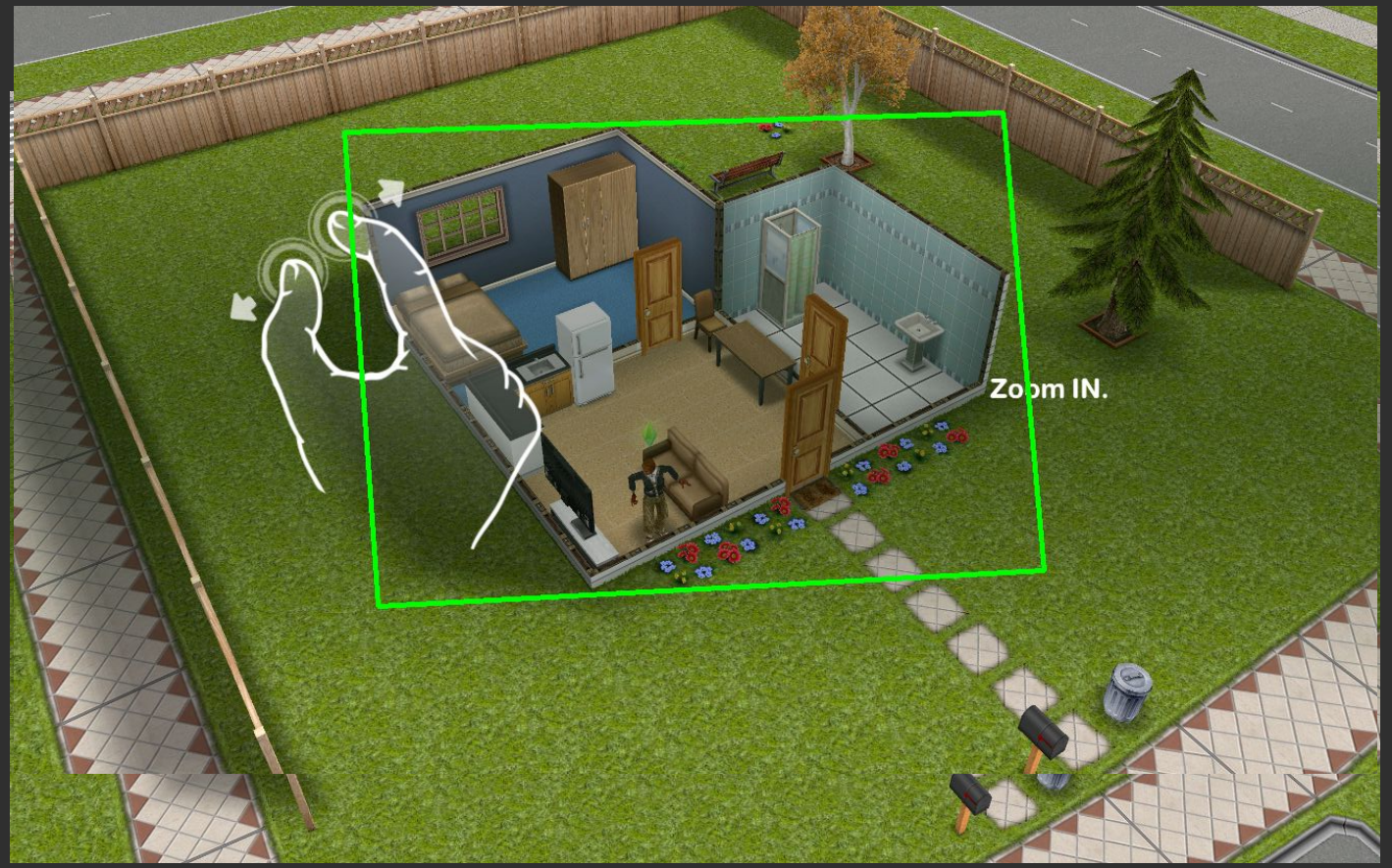
Resolution Agnostic, works rotated and stretched items



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Resolution Agnostic, works rotated and stretched items

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Resolution Agnostic, works rotated and stretched items

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Image Recognition + Appium

https://github.com/bitbar/testdroid-samples/tree/master/image-recognition

- worked well for simple scenarios
- didn’t require any changes to the game
- found really useful issues
  - out of memory problems
  - crashes
  - graphics missing/not displayed correctly

Image Recognition + Appium

https://github.com/bitbar/testdroid-samples/tree/master/image-recognition

- was not fast enough
- graphics change all the time in games
- didn't work well for apps that had a lot of text
- didn’t give enough granularity when it came to identifying objects

Struggles with Test Automation in Games

Struggles with UI Automation in Games

- Small teams => no dedicated testers, developers don’t have time to invest in automated tests
- Large teams => large teams of “manual” testers with not enough coding skills; manual testing takes a lot of time

Struggles with Test Automation in Games

- Make the tools more accessible to testers that have no coding skills
- Cover multiple engines (Unity, Unreal, Godot, o3de)
- Cover multiple platforms
- Keep the development engagement

Beyond Image Recognition

AltTester®

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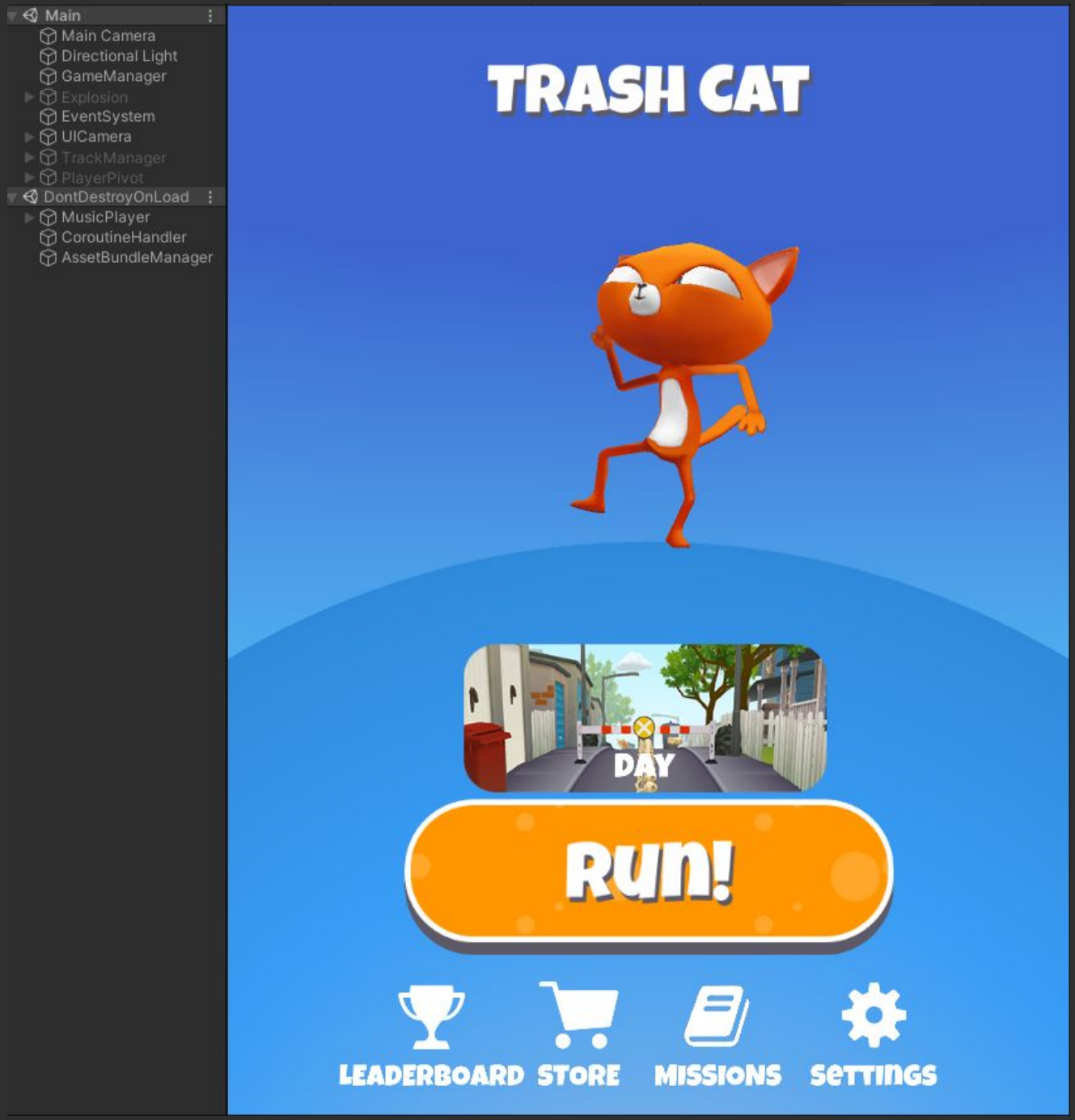
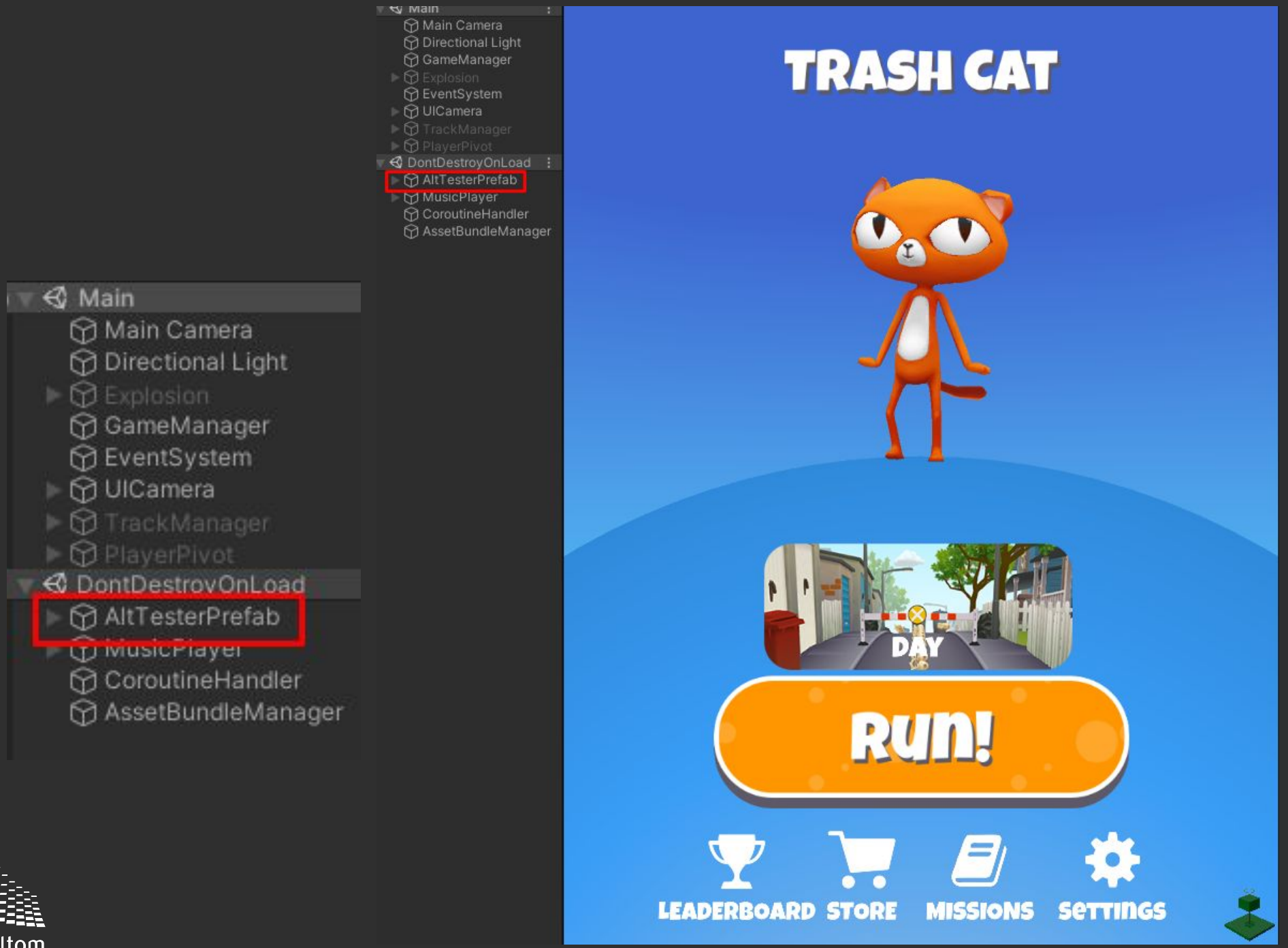

Main
Main Camera
Directional Light
GameManager
Explosion
EventSystem
UICamera
TrackManager
PlayerPivot
DontDestroyOnLoad
MusicPlayer
CoroutineHandler
AssetBundleManager
TRASH CAT
DAY
Run!
LEADERBOARD
STORE
MISSIONS
SETTINGS


Main
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AltTesterPrefab
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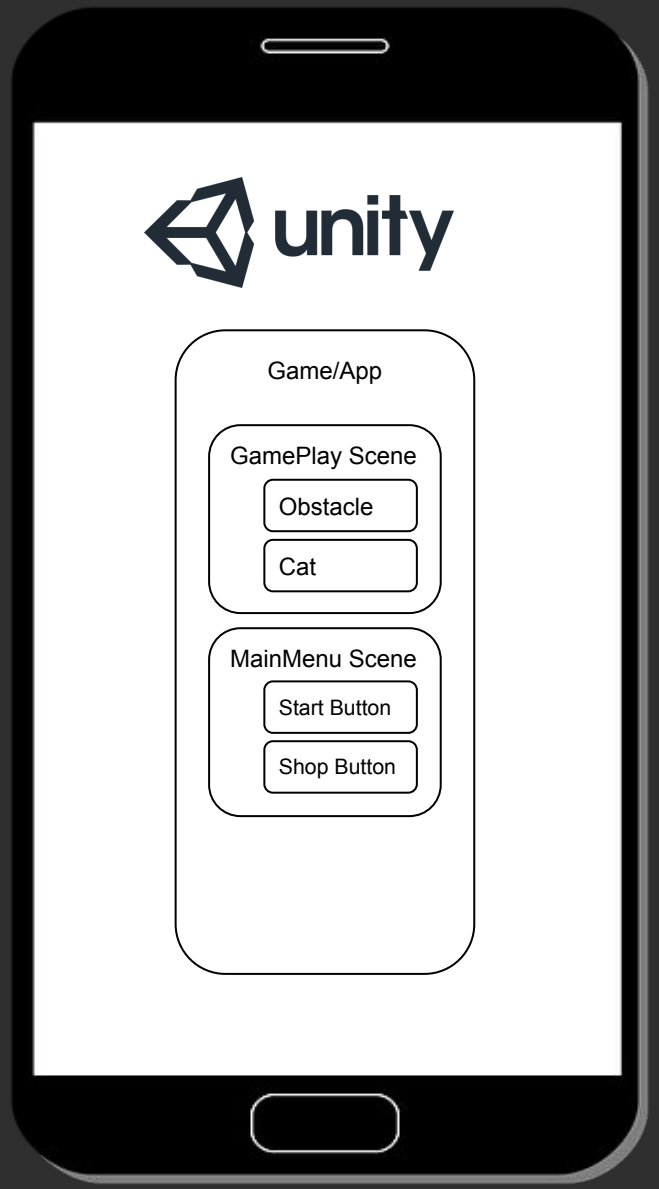
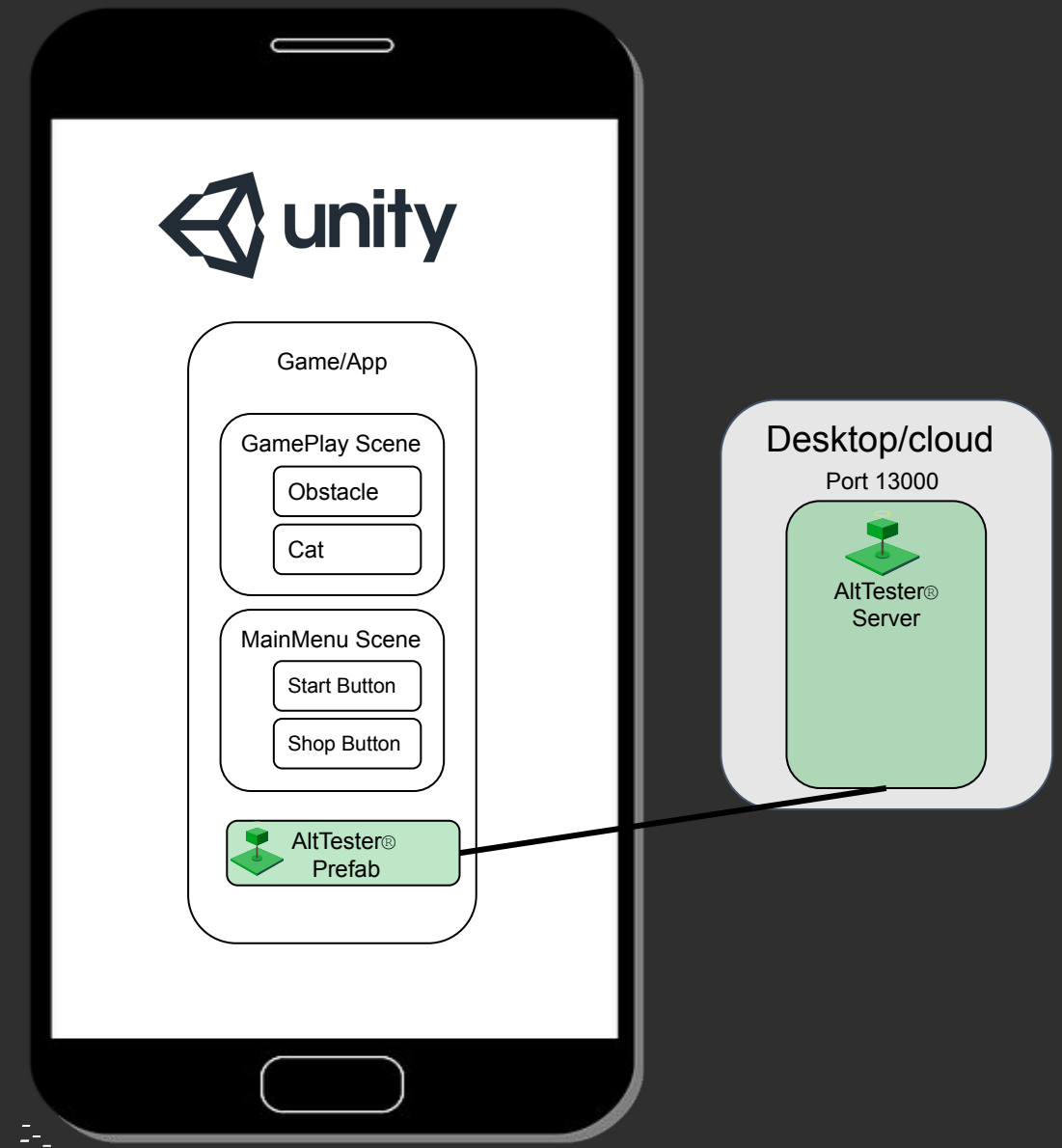

unity
Game/App
GamePlay Scene
Obstacle
Cat
MainMenu Scene
Start Button
Shop Button

Altom


unity
Game/App
GamePlay Scene
Obstacle
Cat
MainMenu Scene
Start Button
Shop Button
AltTester®
Prefab

Desktop/cloud
Port 13000
AltTester®
Server

Altom


unity
Game/App
GamePlay Scene
Obstacle
Cat
MainMenu Scene
Start Button
Shop Button
AltTester®
Prefab
socket connection
Desktop/cloud
Port 13000
AltTester®
Server
AltTester®
altDriver = new AltDriver(tcp_port = 13000);
Bindings for:
python
Java
Works with:
unity Editor

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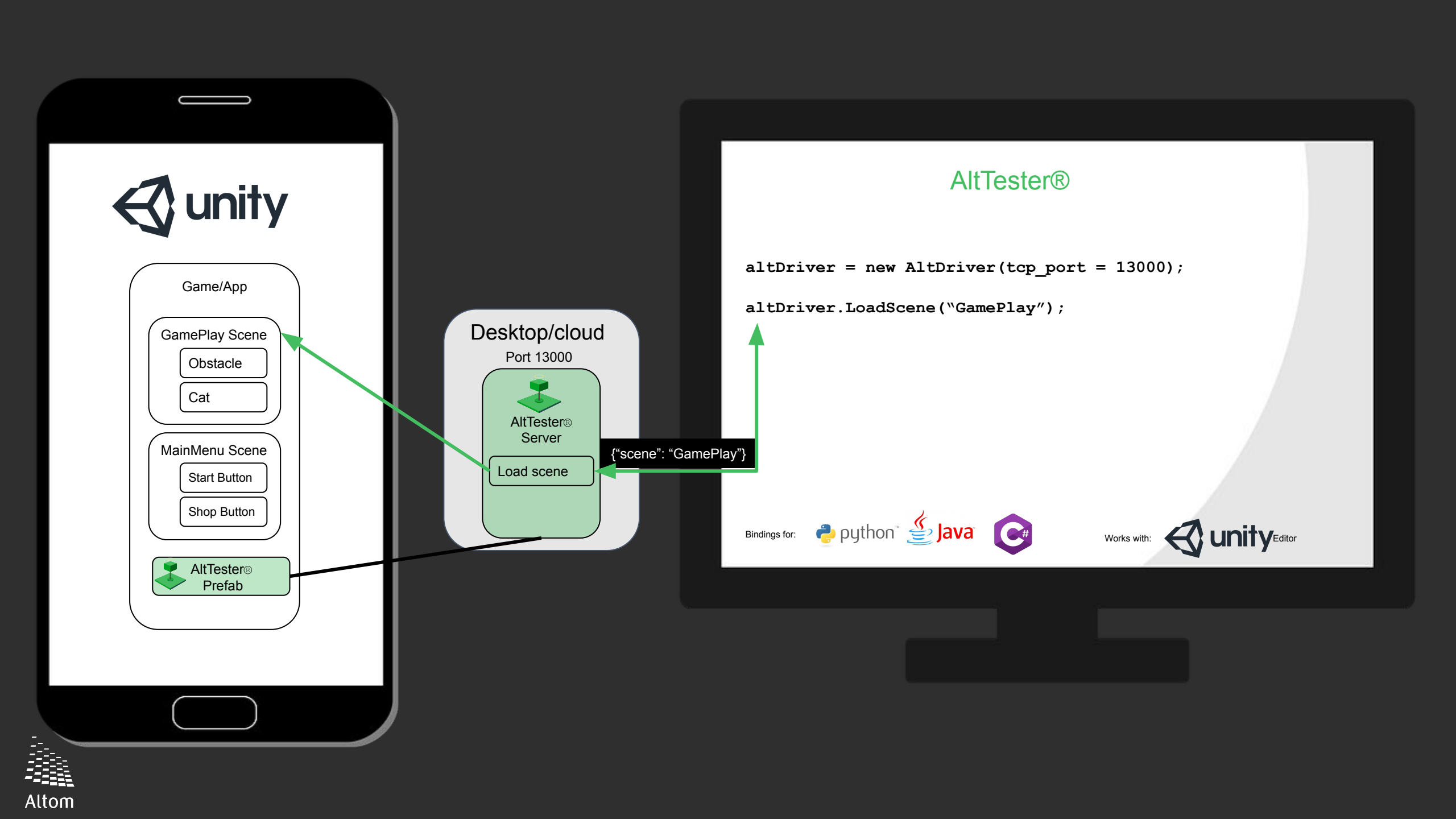
unity
Game/App
GamePlay Scene
Obstacle
Cat
MainMenu Scene
Start Button
Shop Button
AltTester®
Prefab
Desktop/cloud
Port 13000
AltTester®
Server
Load scene
{“scene”: “GamePlay”}
AltTester®
altDriver = new AltDriver(tcp_port = 13000);
altDriver.LoadScene(“GamePlay”);
Bindings for:
python
Java
Works with:
unity Editor

Altom


unity
Game/App
GamePlay Scene
Obstacle
Cat
MainMenu Scene
Start Button
Shop Button
AltTester®
Prefab
Desktop/cloud
Port 13000
AltTester®
Server
Find “Cat”
{“el”: “cat”, “x”: 50, “y”: 60}
AltTester®
altDriver = new AltDriver(tcp_port = 13000);
altDriver.LoadScene(“GamePlay”);
var cat = altDriver.FindObject(By.NAME, “Cat”);
cat.Tap();
Bindings for:
python
Java
Works with:
unity Editor
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AltTester®

https://github.com/alttester

- easier access to objects from the scene
- reduces the time taken for testing - automated tests give fast feedback
- concurrent test execution on multiple devices

AltTester®

- test execution in the cloud (AWS, BitBar, BrowserStack)
- easy to learn by non-technical people (Inspect, Record)
- people skilled in web testing or mobile testing (apps, not games) could learn faster

AltTester®

- worked well even for complex scenarios
- really fast and worked for all types of games
- tests are easier to maintain than with image recognition

Challenges implementing AltTester®

- A more technical person is needed to create the instrumented build. What are the consequences?
- Is click on coordinates reliable?
- Unity has multiple types of objects (objects from the scene, menus, UI toolkit).
- What if the game uses meshes and not objects?

Challenges implementing AltTester®

- Unity has an old and a new input system
- What if the game to be tested uses a custom input system?
- Recorder - what actions do we record?
- Running the same set of tests on 2 standalone builds on the same machine. What happens with the resources?

- Manual testing or automation?
  - ex1. : VuCity - add floors to a newly created building. Has the building the expected height?
  - ex2. : test fonts

Keep the conversation going

Thank you!