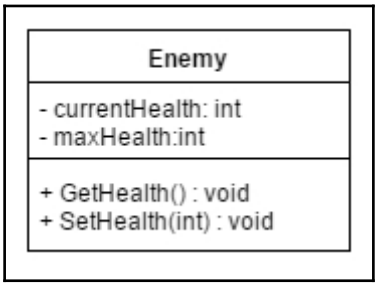
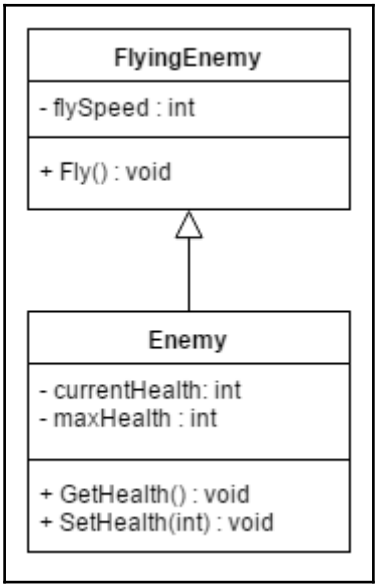
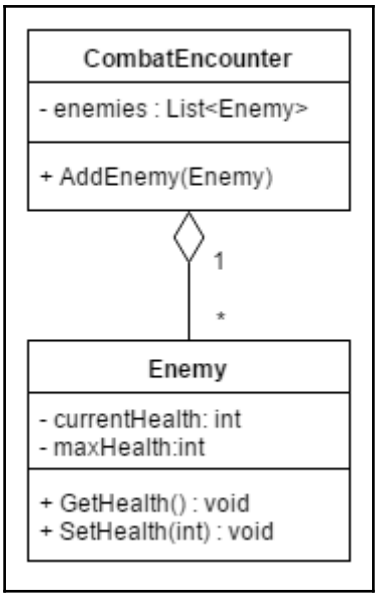
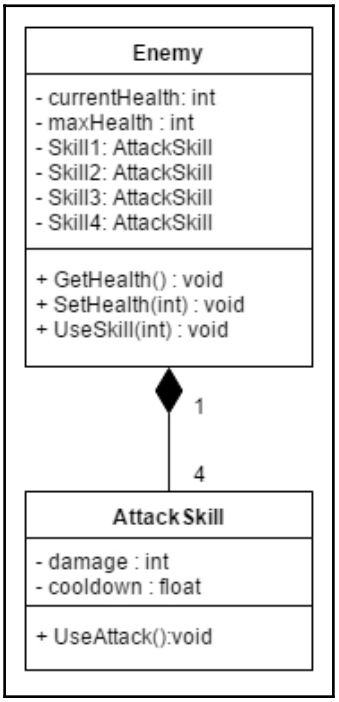
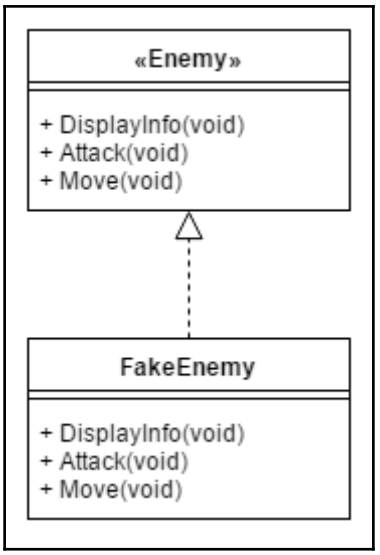
Chapter 1: Introduction to Design Patterns

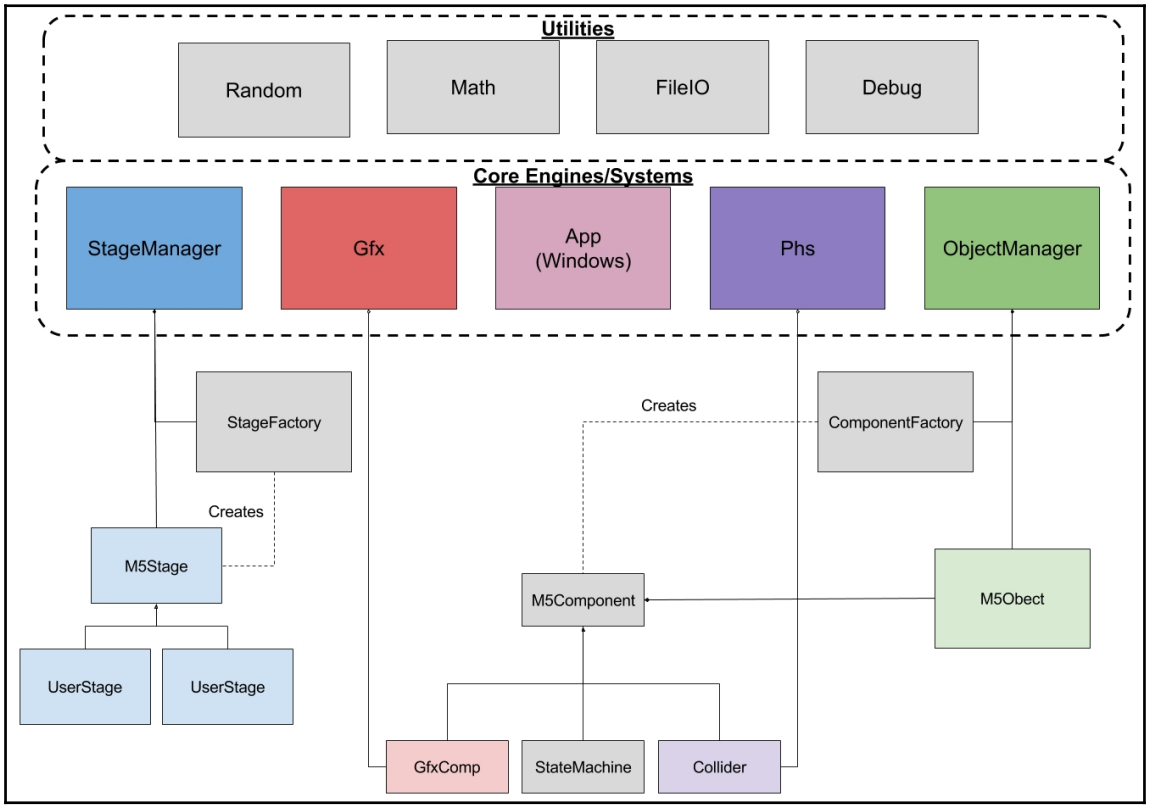


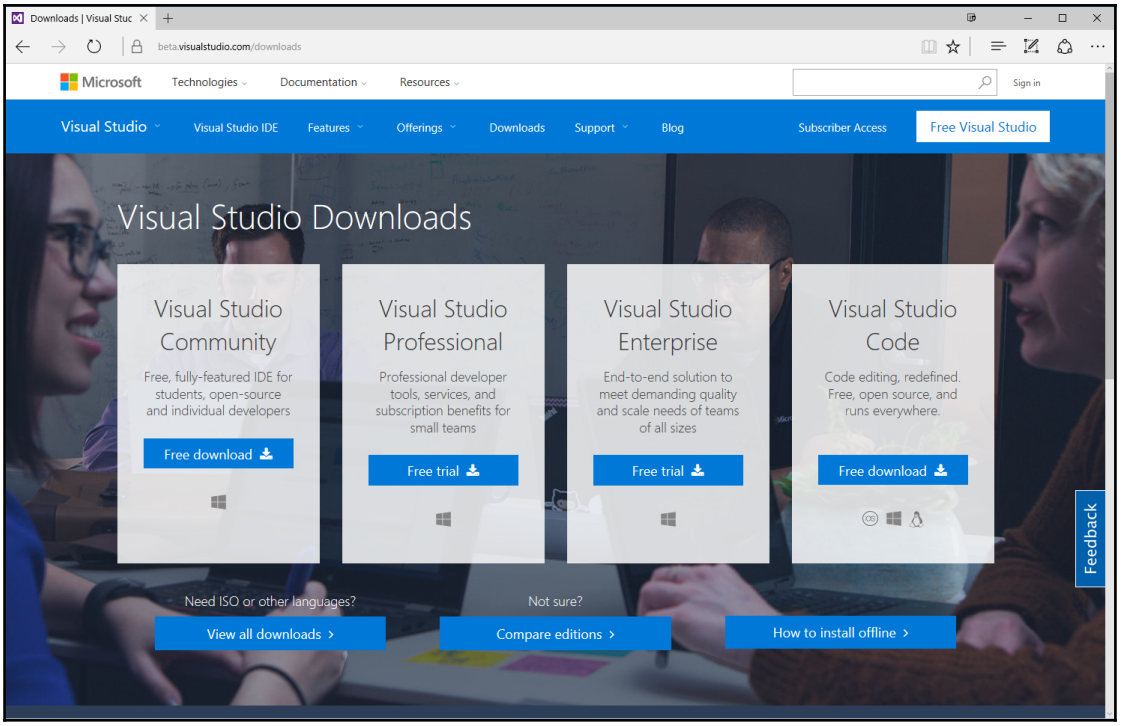



CombatEncounter
- enemies : List<Enemy>
+ AddEnemy(Enemy)
1
*
Enemy
- currentHealth: int
- maxHealth:int
+ GetHealth() : void
+ SetHealth(int) : void


Enemy
- currentHealth: int
- maxHealth : int
- Skill1: AttackSkill
- Skill2: AttackSkill
- Skill3: AttackSkill
- Skill4: AttackSkill
+ GetHealth() : void
+ SetHealth(int) : void
+ UseSkill(int) : void
1
4
AttackSkill
- damage : int
- cooldown : float
+ UseAttack():void


«Enemy»
+ DisplayInfo(void)
+ Attack(void)
+ Move(void)
FakeEnemy
+ DisplayInfo(void)
+ Attack(void)
+ Move(void)


Utilities
Random
Math
FileIO
Debug
Core Engines/Systems
StageManager
Gfx
App
(Windows)
Phs
ObjectManager
StageFactory
Creates
ComponentFactory
Creates
M5Stage
M5Component
M5Obect
UserStage
UserStage
GfxComp
StateMachine
Collider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End-to-end solution to meet demanding quality and scale needs of teams of all sizes
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Visual Studio Code
Code editing, redefined. Free, open source, and runs everywhere.
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Need ISO or other languages?
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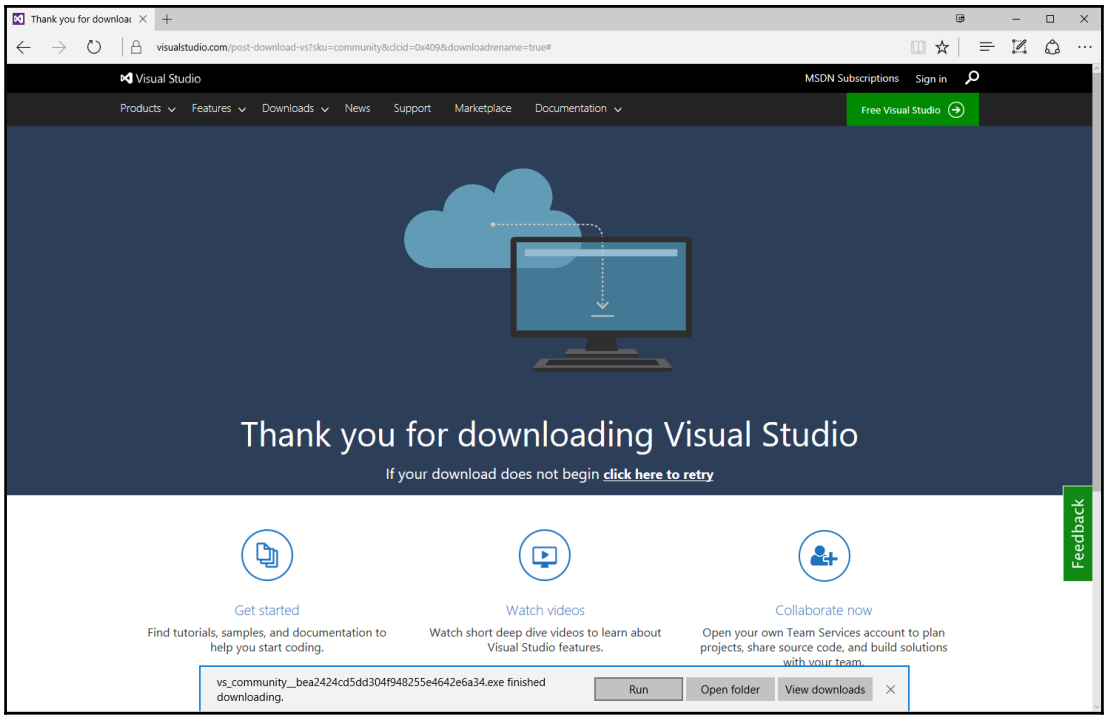
Compare editions ›
How to install offline ›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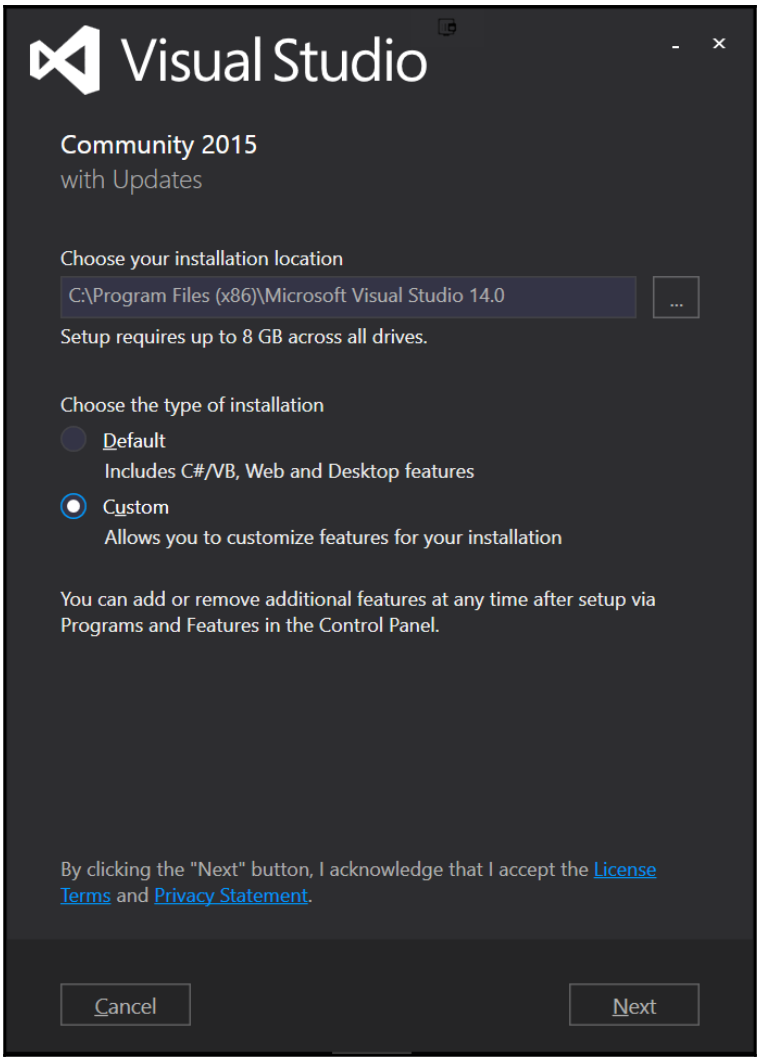
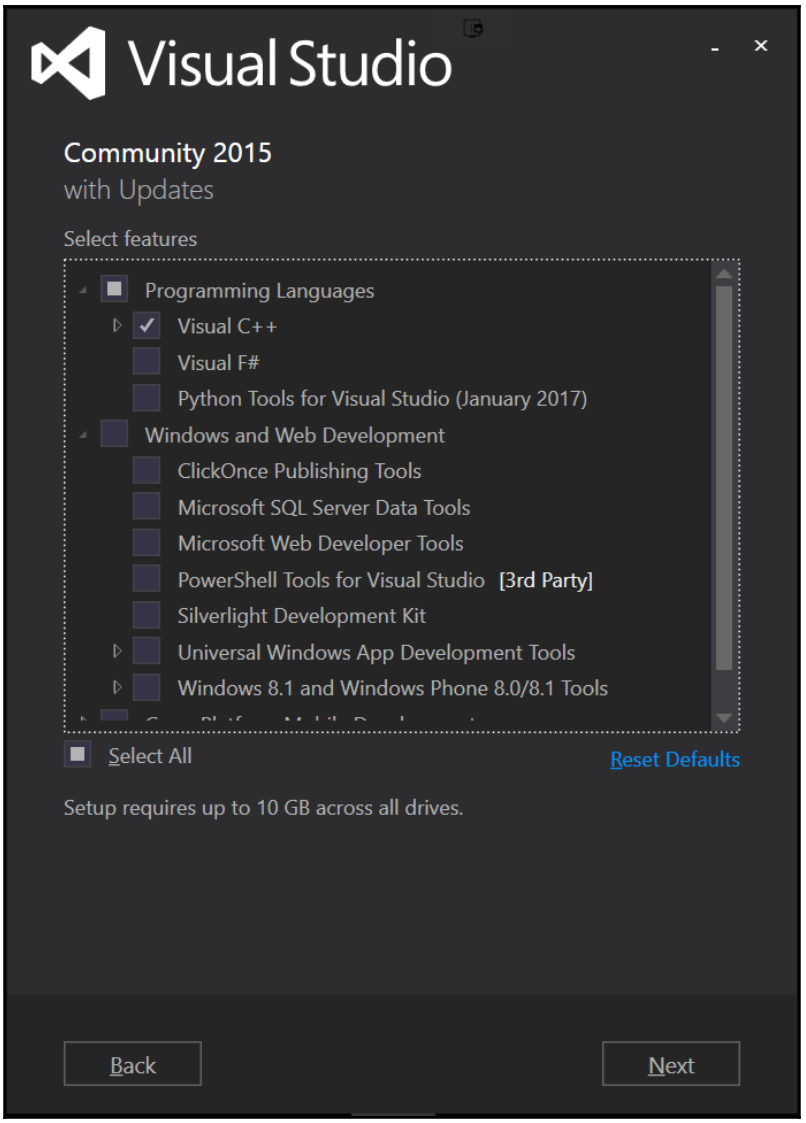
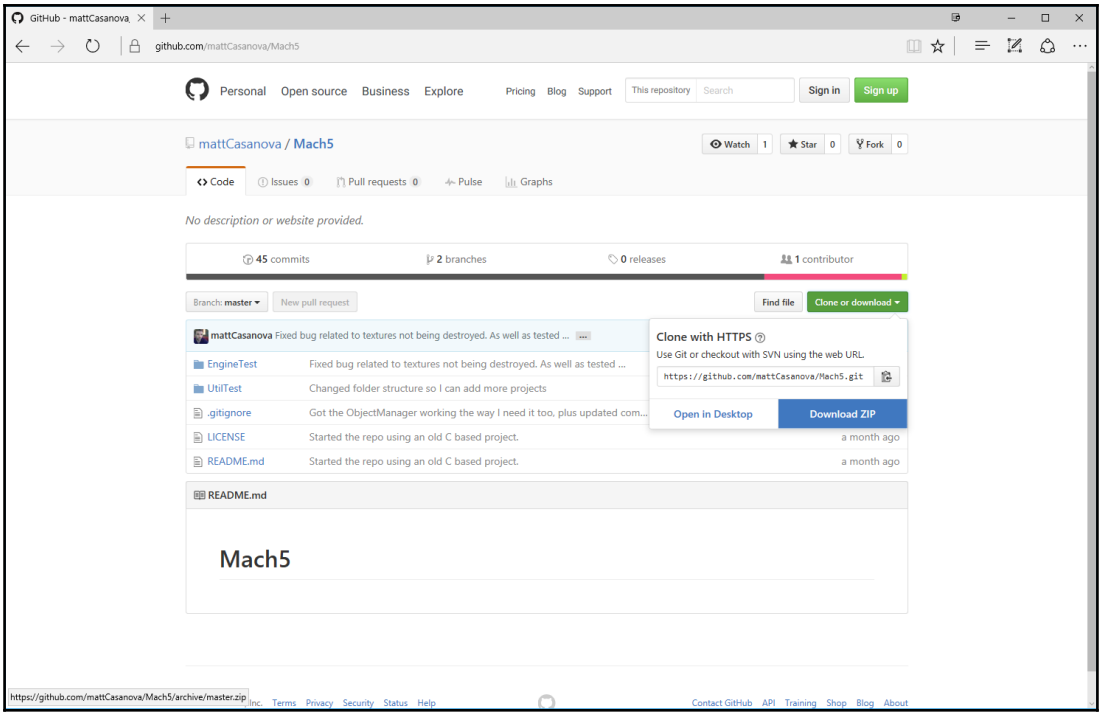
Open your own Team Services account to plan projects, share source code, and build solutions with your team.
vs_community__bea2424cd5dd304f948255e4642e6a34.exe finished downloading.
Run
Open folder
View downloads


Visual Studio
Community 2015
with Updates
Choose your installation location
C:\Program Files (x86)\Microsoft Visual Studio 14.0
...
Setup requires up to 8 GB across all drives.
Choose the type of installation
Default
Includes C#/VB, Web and Desktop features
Custom
Allows you to customize features for your installation
You can add or remove additional features at any time after setup via Programs and Features in the Control Panel.
By clicking the "Next" button, I acknowledge that I accept the License Terms and Privacy Statement.
Cancel
Next


Visual Studio
Community 2015
with Updates
Select features
Programming Languages
Visual C++
Visual F#
Python Tools for Visual Studio (January 2017)
Windows and Web Development
ClickOnce Publishing Tools
Microsoft SQL Server Data Tools
Microsoft Web Developer Tools
PowerShell Tools for Visual Studio [3rd Party]
Silverlight Development Kit
Universal Windows App Development Tools
Windows 8.1 and Windows Phone 8.0/8.1 Tools
Select All
Reset Defaults
Setup requires up to 10 GB across all drives.
Back
Next


GitHub - mattCasanova
github.com/mattCasanova/Mach5
Personal
Open source
Business
Explore
Pricing
Blog
Support
This repository
Search
Sign in
Sign up
mattCasanova / Mach5
Watch 1
Star 0
Fork 0
Code
Issues 0
Pull requests 0
Pulse
Graphs
No description or website provided.
45 commits
2 branches
0 releases
1 contributor
Branch: master
New pull request
Find file
Clone or download
mattCasanova Fixed bug related to textures not being destroyed. As well as tested ...
EngineTest
Fixed bug related to textures not being destroyed. As well as tested ...
UtilTest
Changed folder structure so I can add more projects
.gitignore
Got the ObjectManager working the way I need it too, plus updated com...
LICENSE
Started the repo using an old C based project.
a month ago
README.md
Started the repo using an old C based project.
a month ago
Clone with HTTPS
Use Git or checkout with SVN using the web URL.
https://github.com/mattCasanova/Mach5.git
Open in Desktop
Download ZIP
README.md
Mach5
https://github.com/mattCasanova/Mach5/archive/master.zip
Terms
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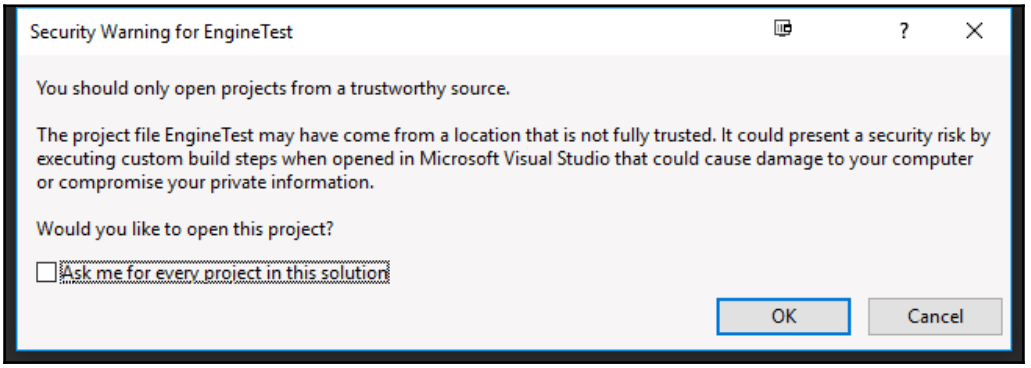
Security Warning for EngineTest
You should only open projects from a trustworthy source.
The project file EngineTest may have come from a location that is not fully trusted. It could present a security risk by executing custom build steps when opened in Microsoft Visual Studio that could cause damage to your computer or compromise your private information.
Would you like to open this project?
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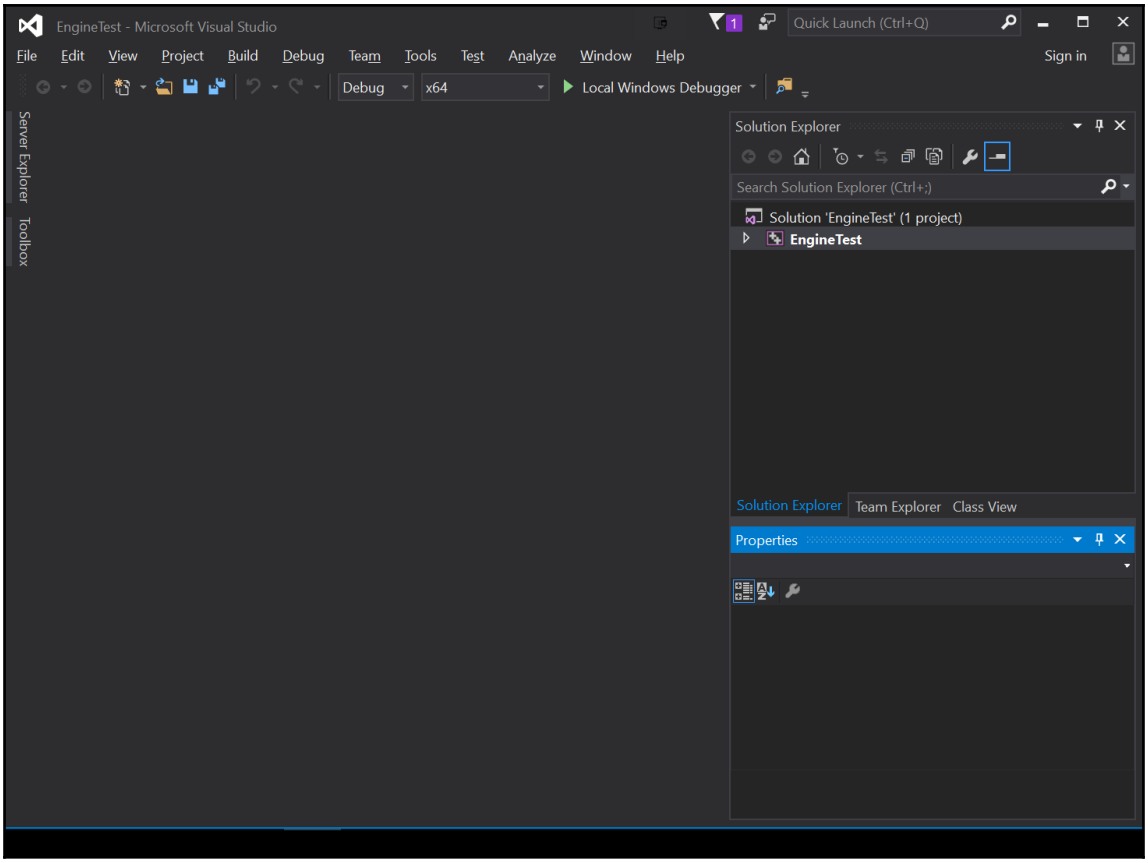
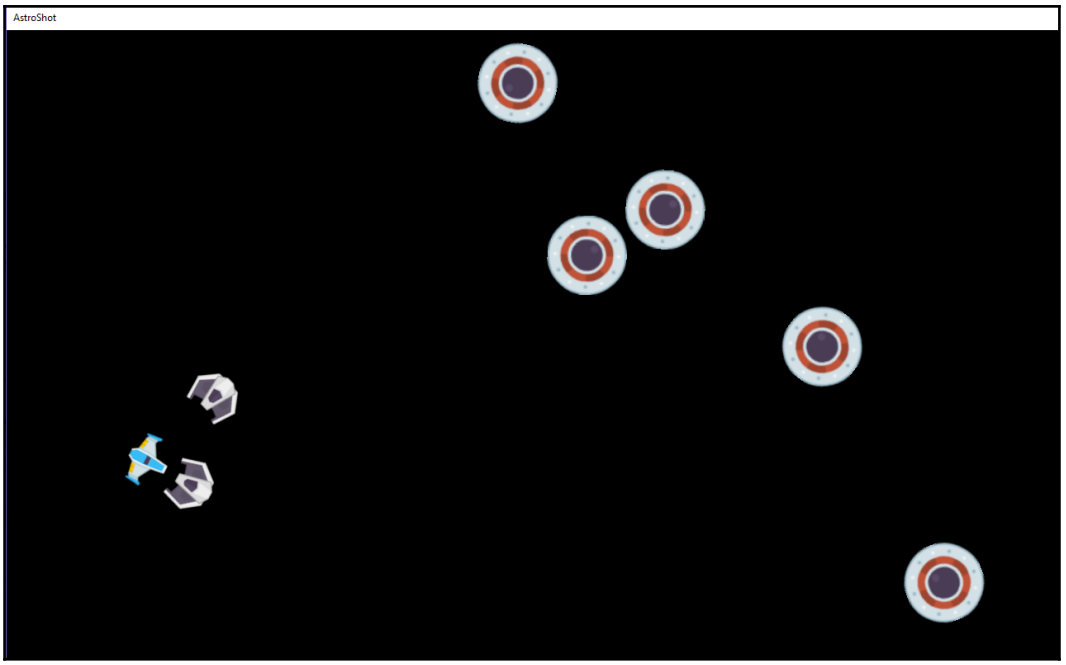
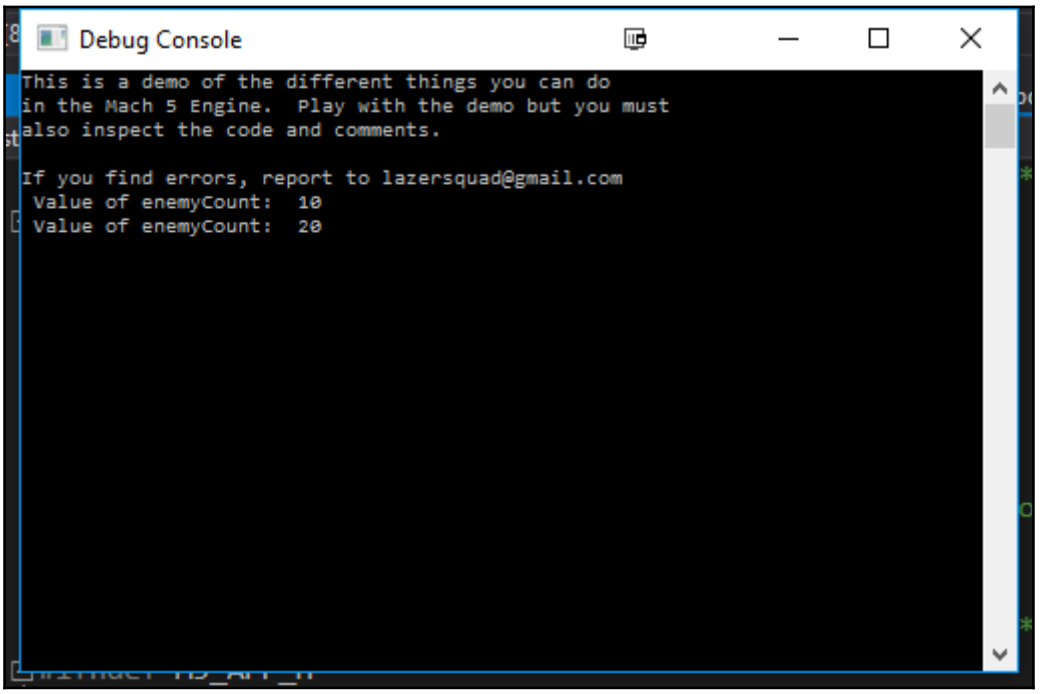
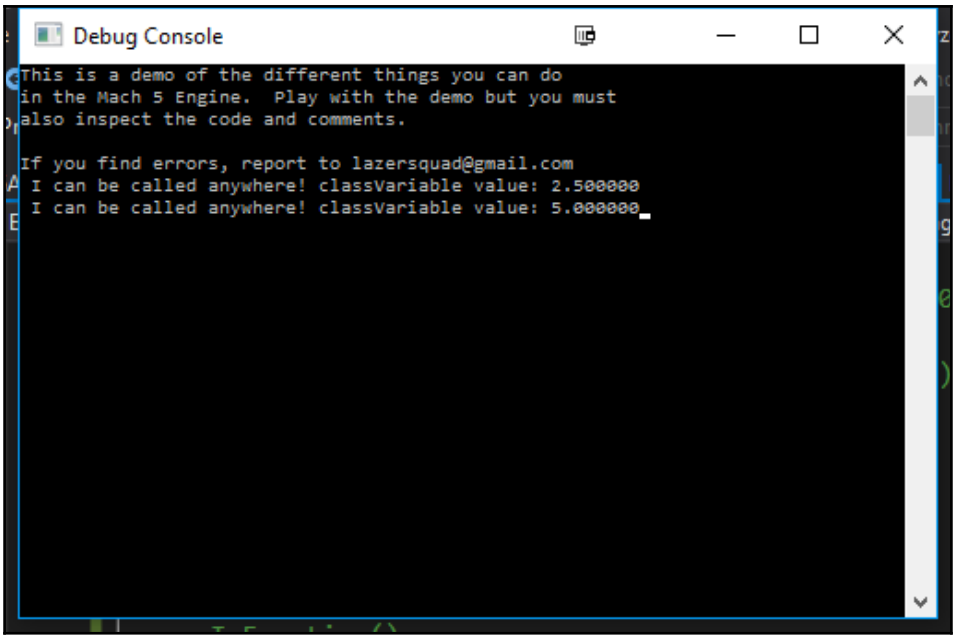
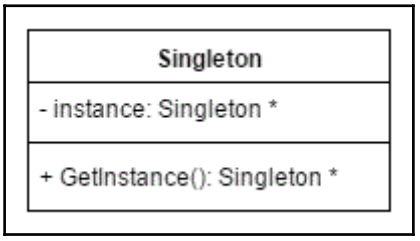

EngineTest - Microsoft Visual Studio
Quick Launch (Ctrl+Q)
File Edit View Project Build Debug Team Tools Test Analyze Window Help
Sign in
Debug
x64
Local Windows Debugger
Server Explorer
Toolbox
Solution Explorer
Search Solution Explorer (Ctrl+;)
Solution 'EngineTest' (1 project)
EngineTest
Solution Explorer
Team Explorer
Class View
Properties

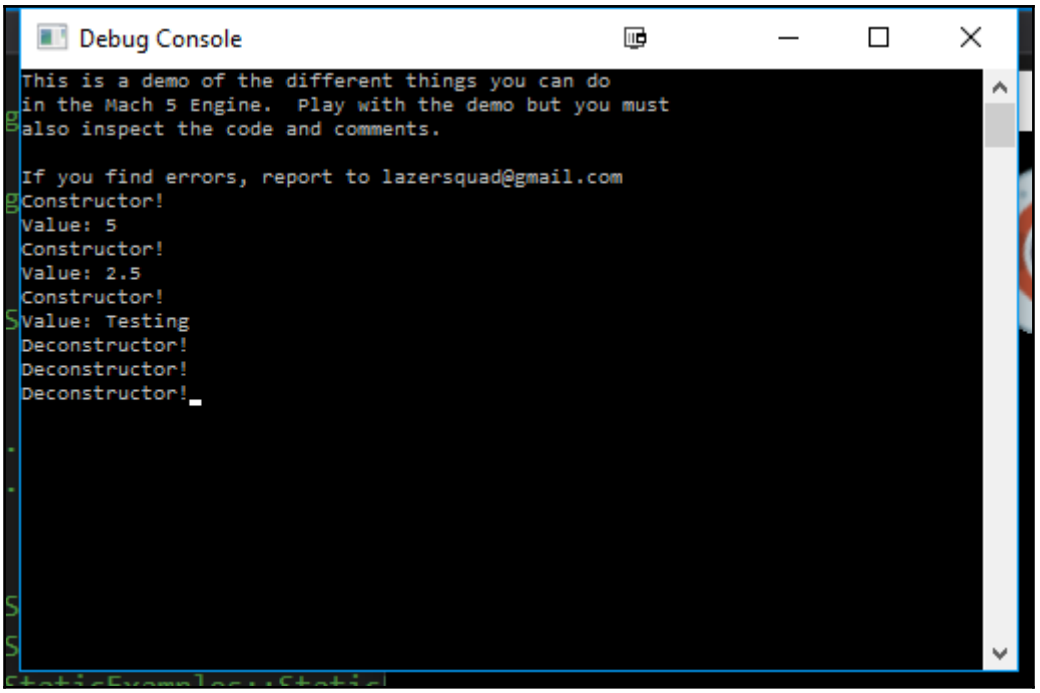

AstroShot

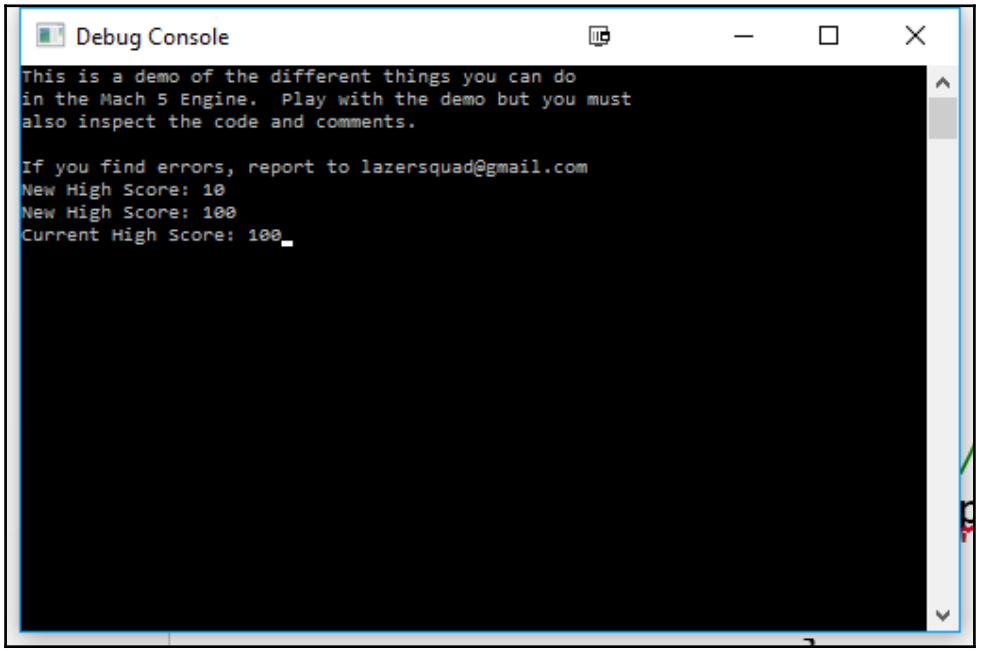
Chapter 2: One Instance to Rule Them All - Singletons



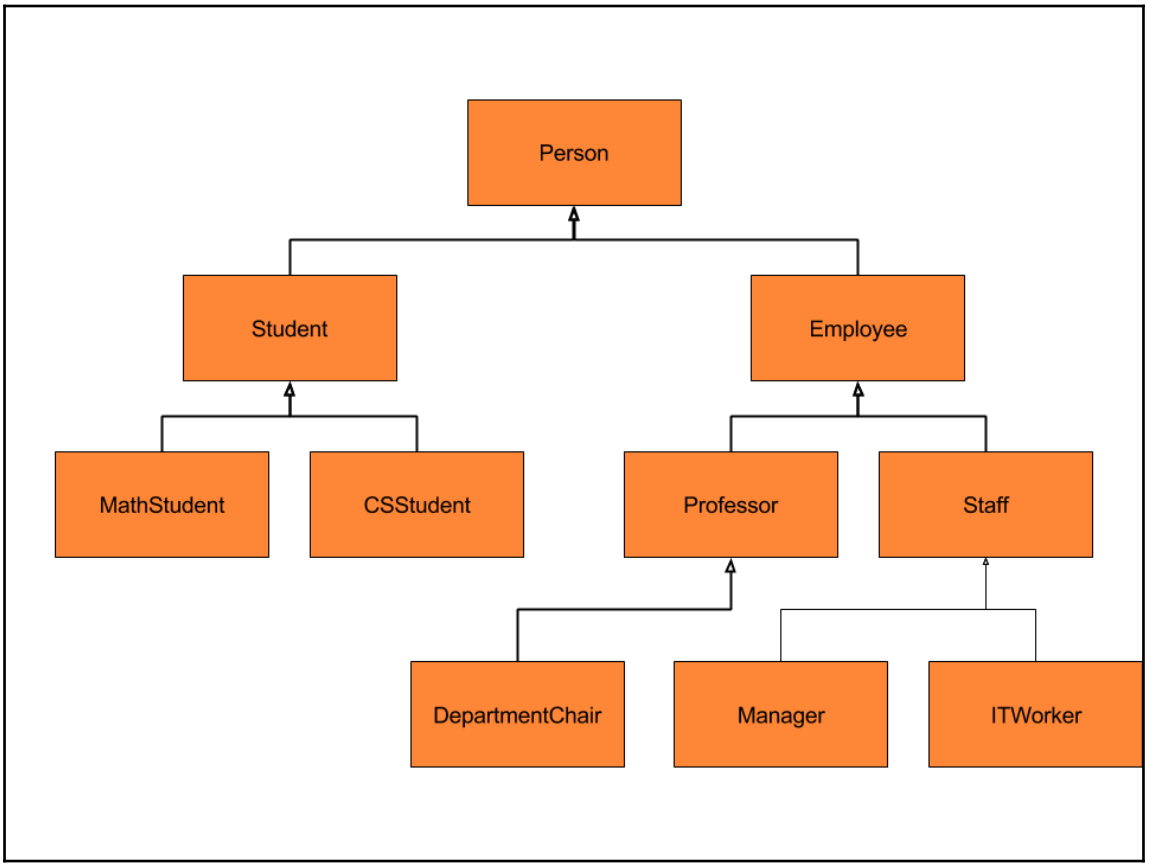

Debug Console
This is a demo of the different things you can do
in the Mach 5 Engine. Play with the demo but you must
also inspect the code and comments.
If you find errors, report to lazersquad@gmail.com
I can be called anywhere! classVariable value: 2.500000
I can be called anywhere! classVariable value: 5.000000

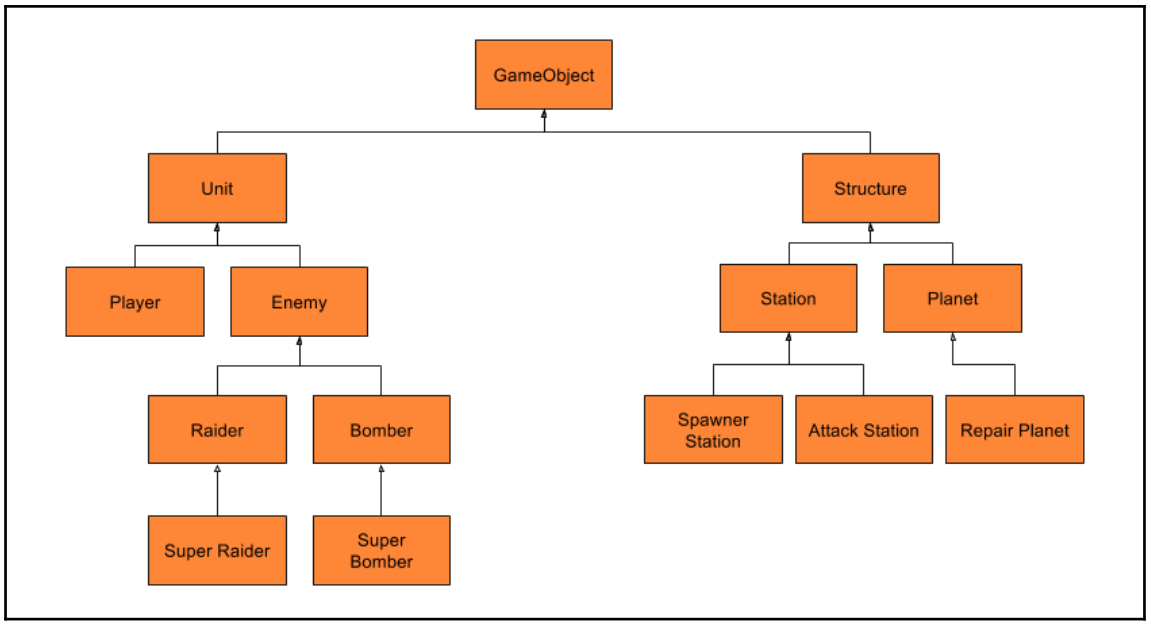

Singleton
- instance: Singleton *
+ GetInstance(): Singleton *

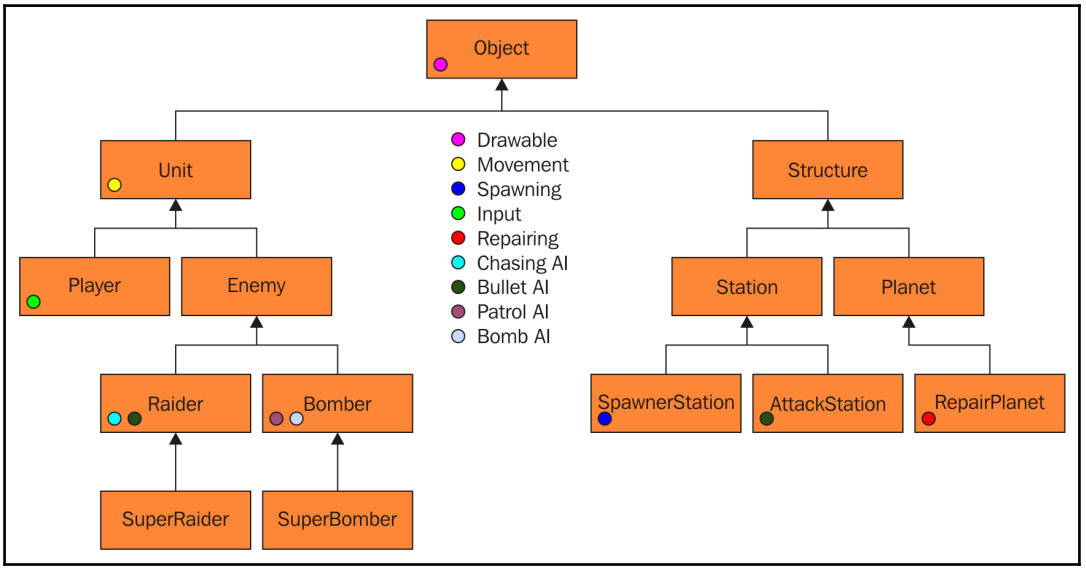

Debug Console
This is a demo of the different things you can do
in the Mach 5 Engine. Play with the demo but you must
also inspect the code and comments.
If you find errors, report to lazersquad@gmail.com
Constructor!
Value: 5
Constructor!
Value: 2.5
Constructor!
Value: Testing
Deconstructor!
Deconstructor!
Deconstructor!

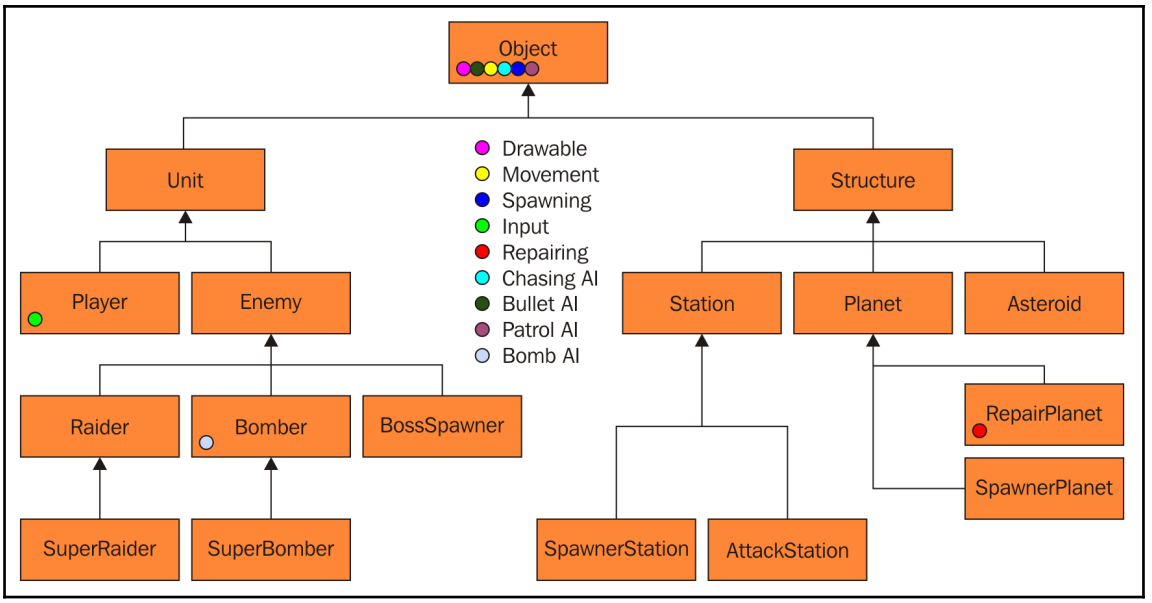

Debug Console
This is a demo of the different things you can do
in the Mach 5 Engine. Play with the demo but you must
also inspect the code and comments.
If you find errors, report to lazersquad@gmail.com
New High Score: 10
New High Score: 100
Current High Score: 100

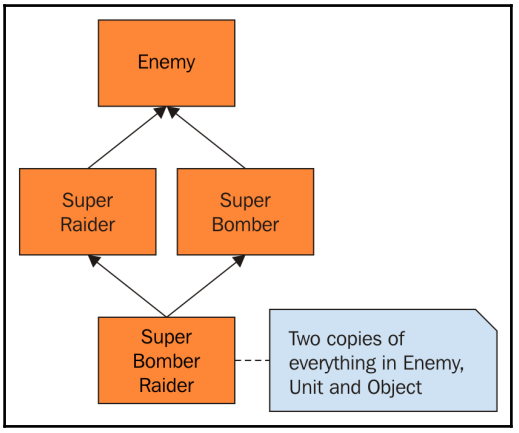
Chapter 3:
Creating Flexibility with the Component Obje ct Model

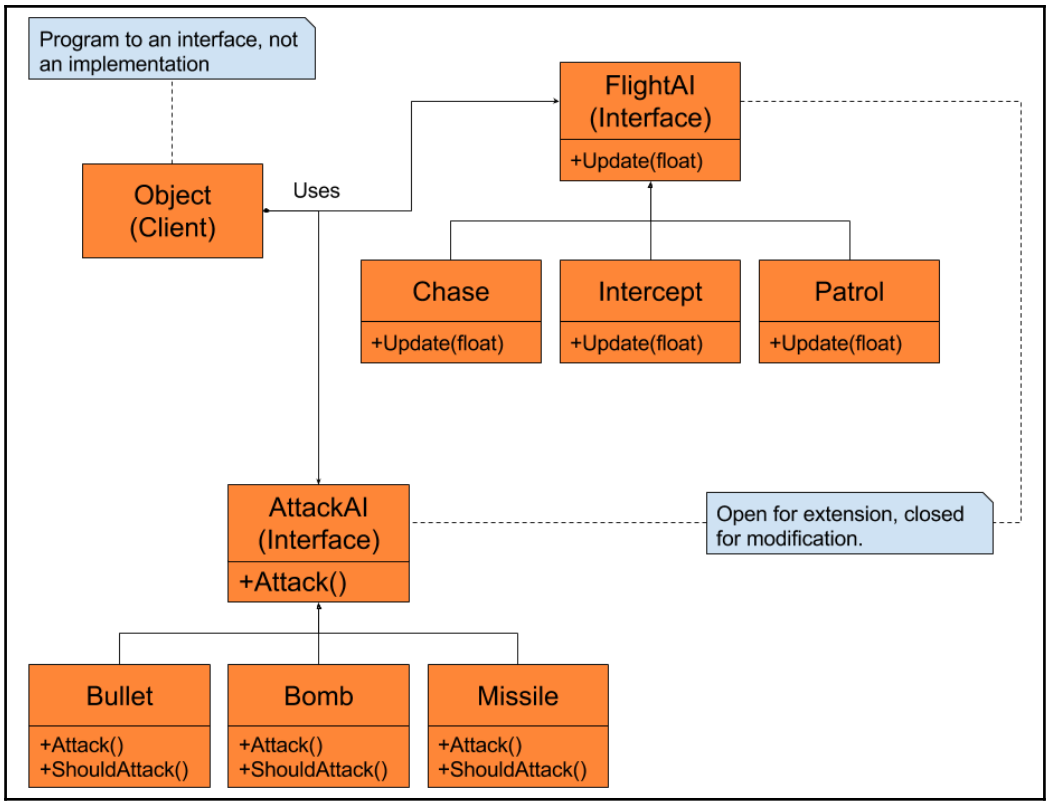


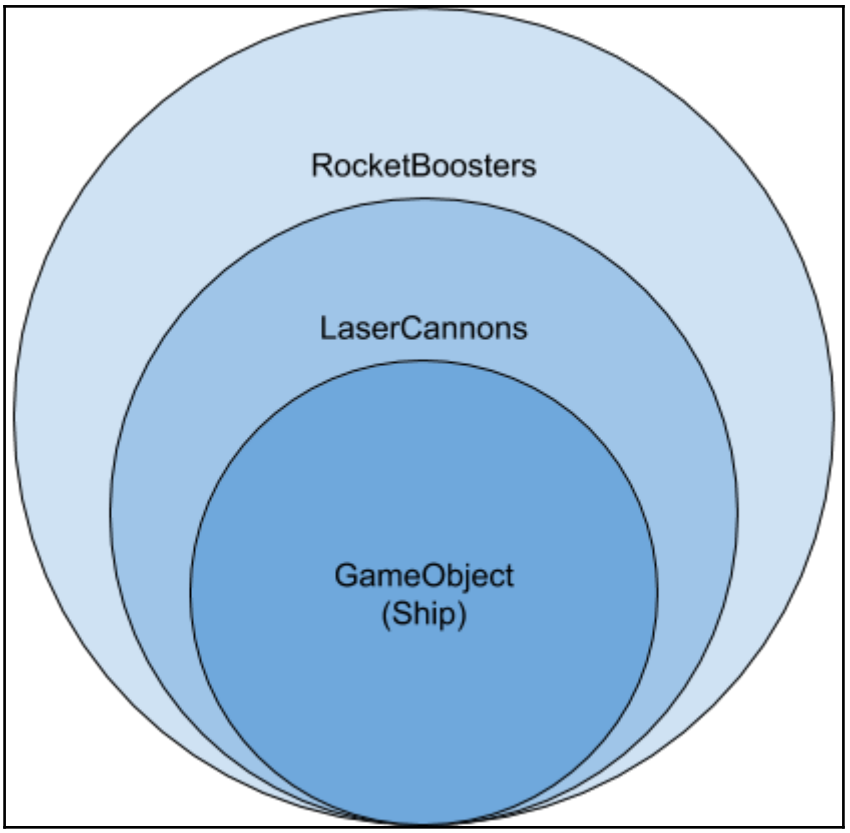

GameObject
Unit
Structure
Player
Enemy
Station
Planet
Raider
Bomber
Spawner Station
Attack Station
Repair Planet
Super Raider
Super Bomber

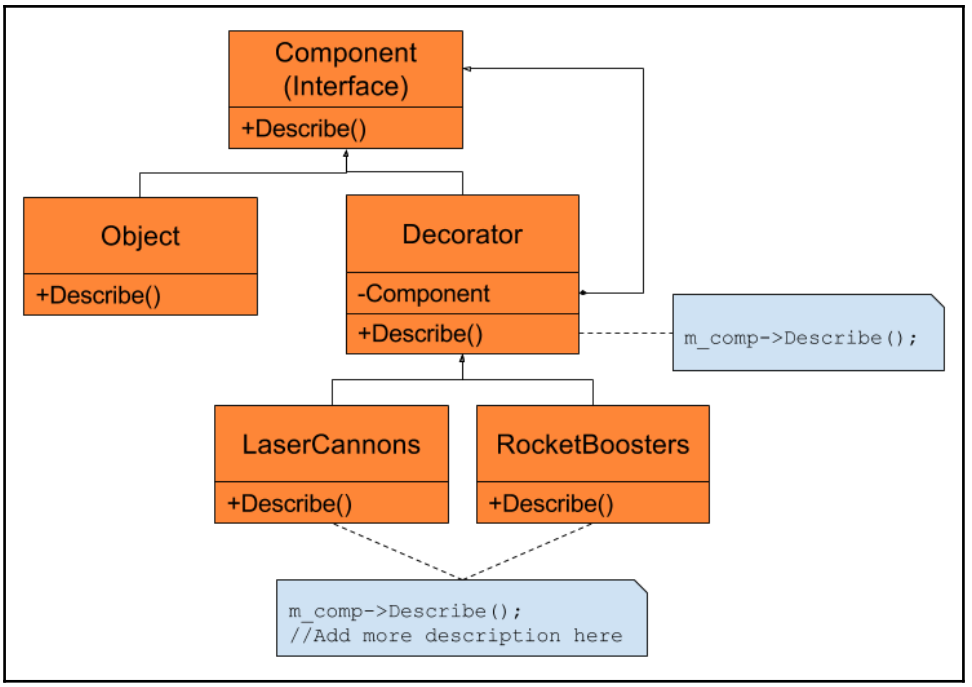

Object
Drawable
Movement
Spawning
Input
Repairing
Chasing AI
Bullet AI
Patrol AI
Bomb AI
Unit
Structure
Player
Enemy
Station
Planet
Raider
Bomber
SpawnerStation
AttackStation
RepairPlanet
SuperRaider
SuperBomber

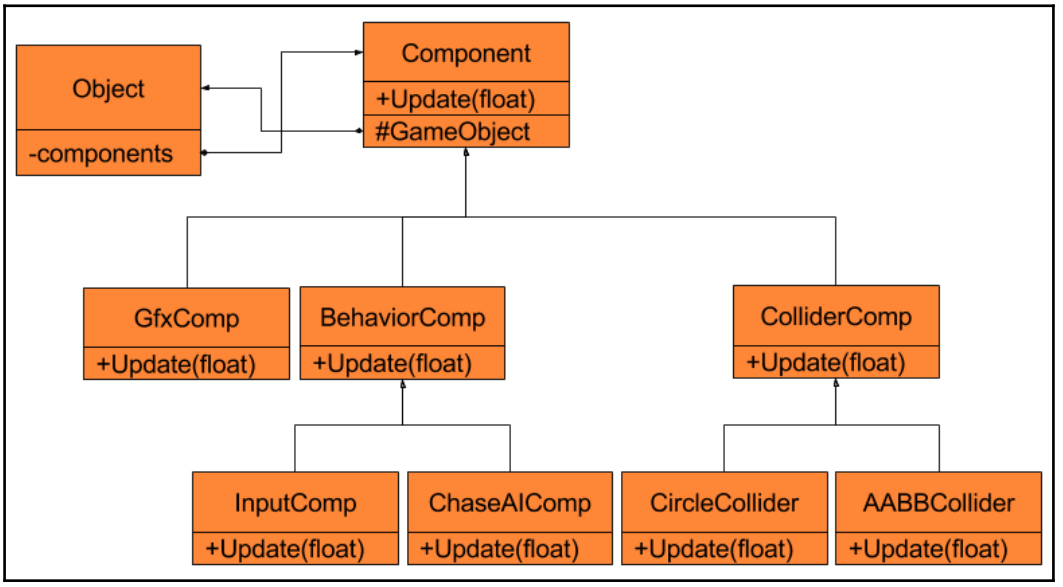

Object
Drawable
Movement
Spawning
Input
Repairing
Chasing AI
Bullet AI
Patrol AI
Bomb AI
Unit
Structure
Player
Enemy
Station
Planet
Asteroid
Raider
Bomber
BossSpawner
RepairPlanet
SpawnerPlanet
SuperRaider
SuperBomber
SpawnerStation
AttackStation


Enemy
Super Raider
Super Bomber
Super Bomber Raider
Two copies of everything in Enemy, Unit and Object

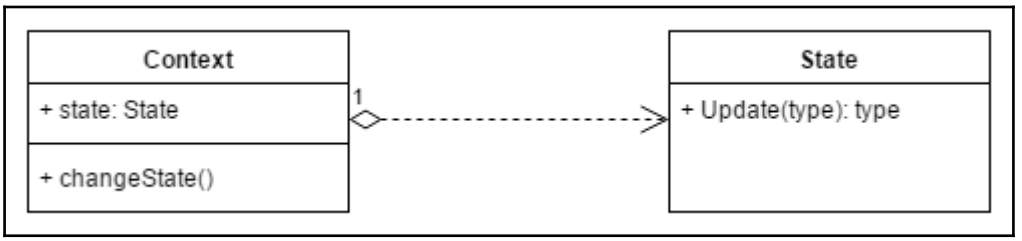

Program to an interface, not an implementation
FlightAI (Interface)
+Update(float)
Object (Client)
Uses
Chase
+Update(float)
Intercept
+Update(float)
Patrol
+Update(float)
AttackAI (Interface)
+Attack()
Open for extension, closed for modification.
Bullet
+Attack()
+ShouldAttack()
Bomb
+Attack()
+ShouldAttack()
Missile
+Attack()
+ShouldAttack()

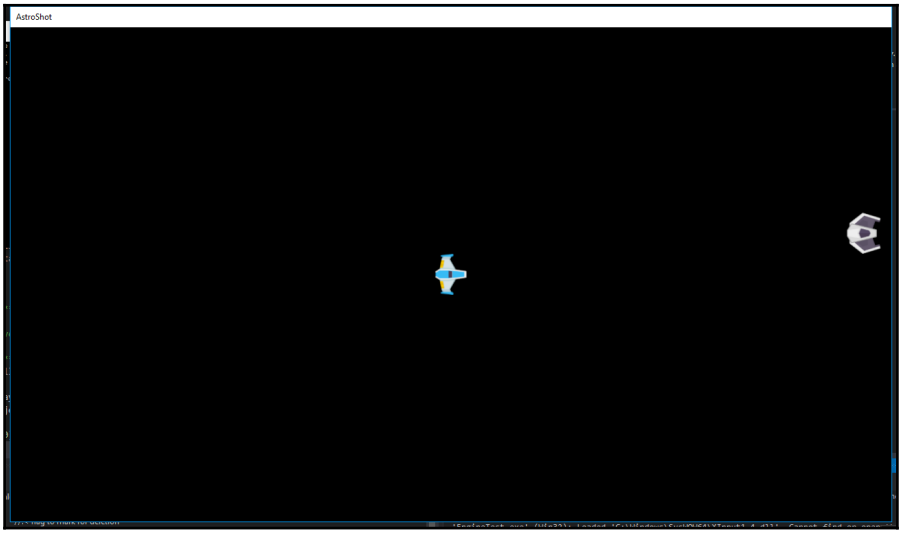

RocketBoosters
LaserCannons
GameObject
(Ship)

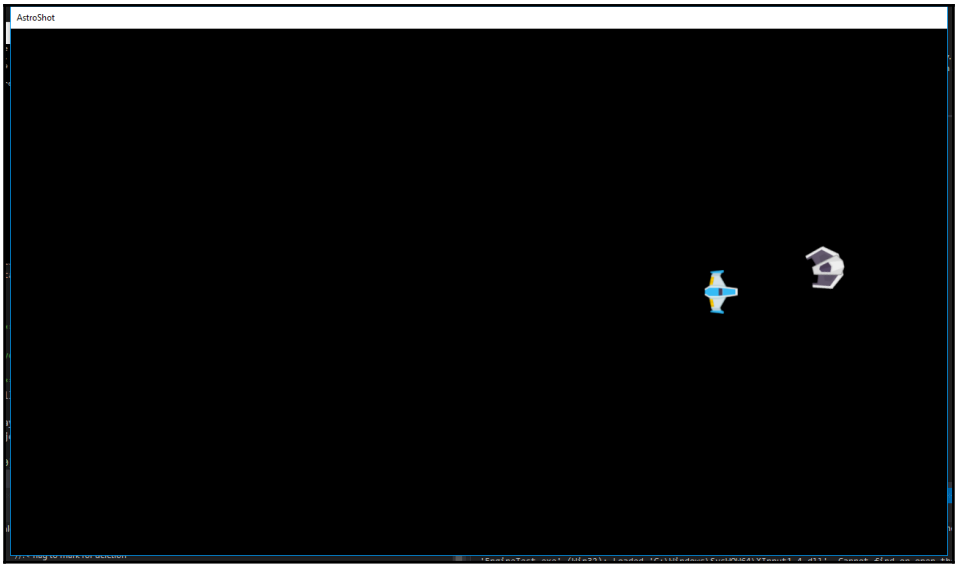

Component
(Interface)
+Describe()
Object
+Describe()
Decorator
-Component
+Describe()
m_comp->Describe();
LaserCannons
+Describe()
RocketBoosters
+Describe()
m_comp->Describe();
//Add more description here

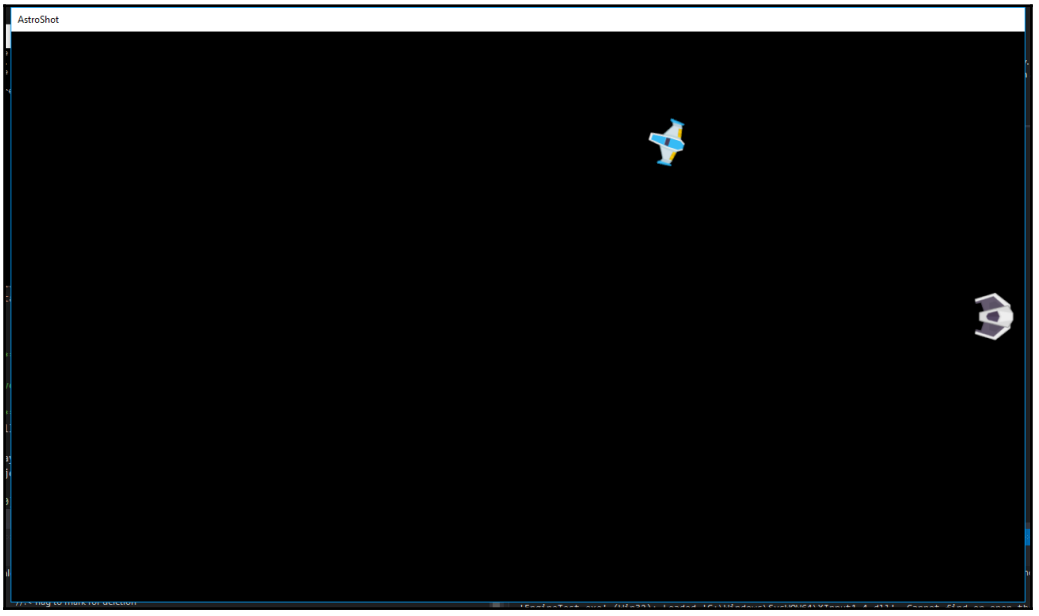

Object
-components
Component
+Update(float)
#GameObject
GfxComp
+Update(float)
BehaviorComp
+Update(float)
ColliderComp
+Update(float)
InputComp
+Update(float)
ChaseAIComp
+Update(float)
CircleCollider
+Update(float)
AABBCollider
+Update(float)

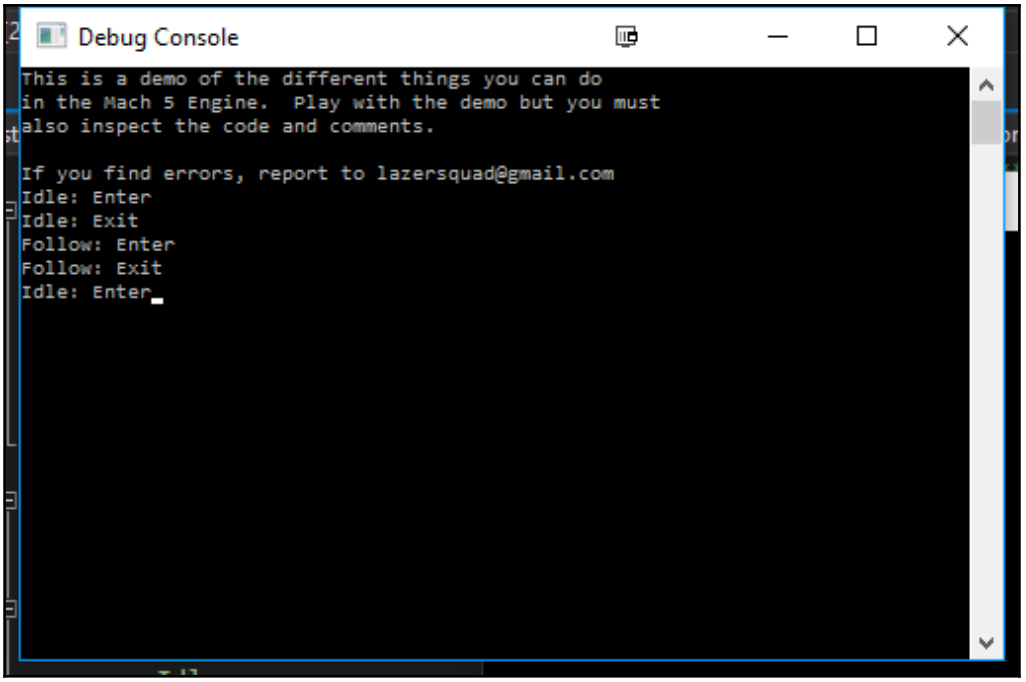
Chapter 4:
Artificial Intelligence Using the State Pattern





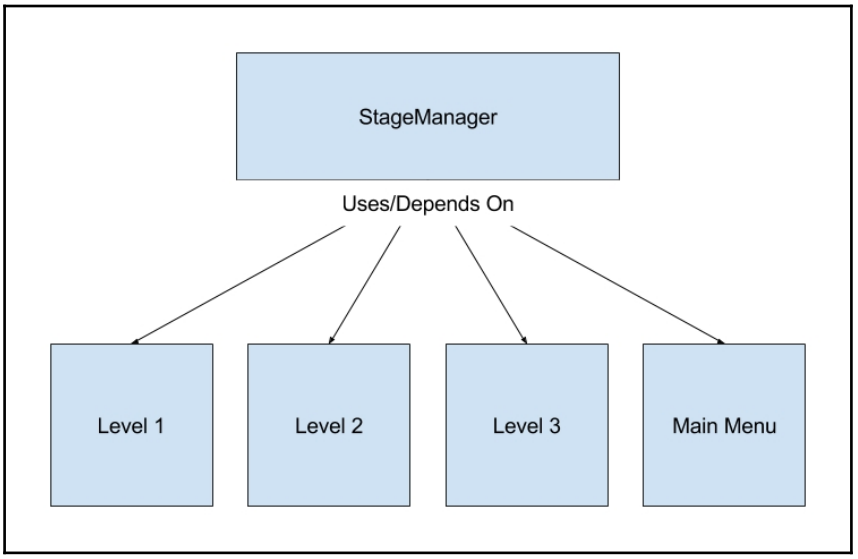

AstroShot

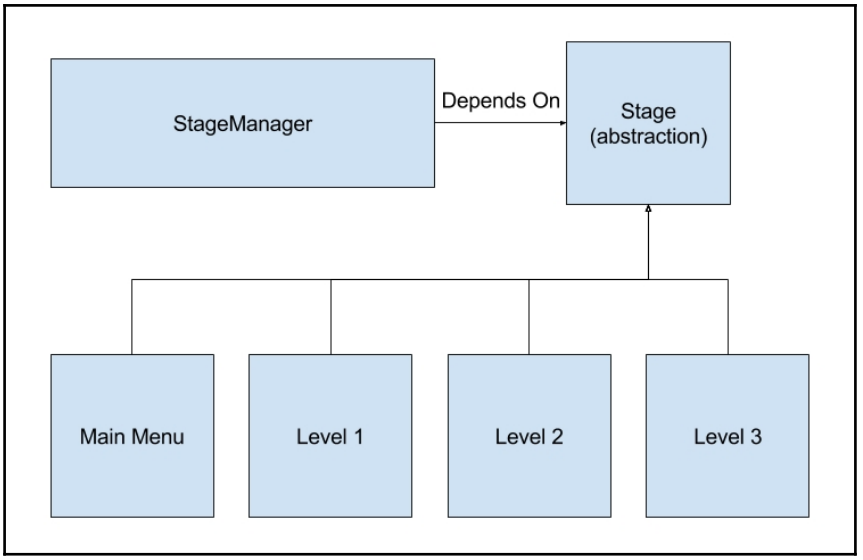

AstroShot

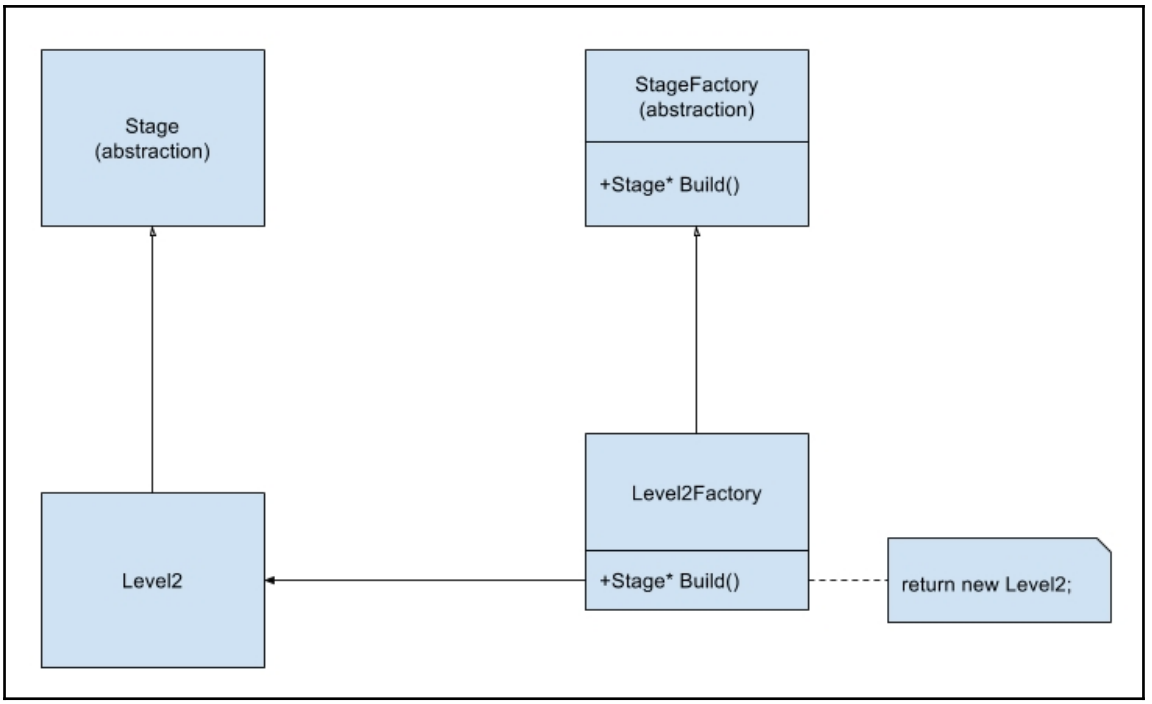

Debug Console
This is a demo of the different things you can do
in the Mach 5 Engine. Play with the demo but you must
also inspect the code and comments.
If you find errors, report to lazersquad@gmail.com
Idle: Enter
Idle: Exit
Follow: Enter
Follow: Exit
Idle: Enter

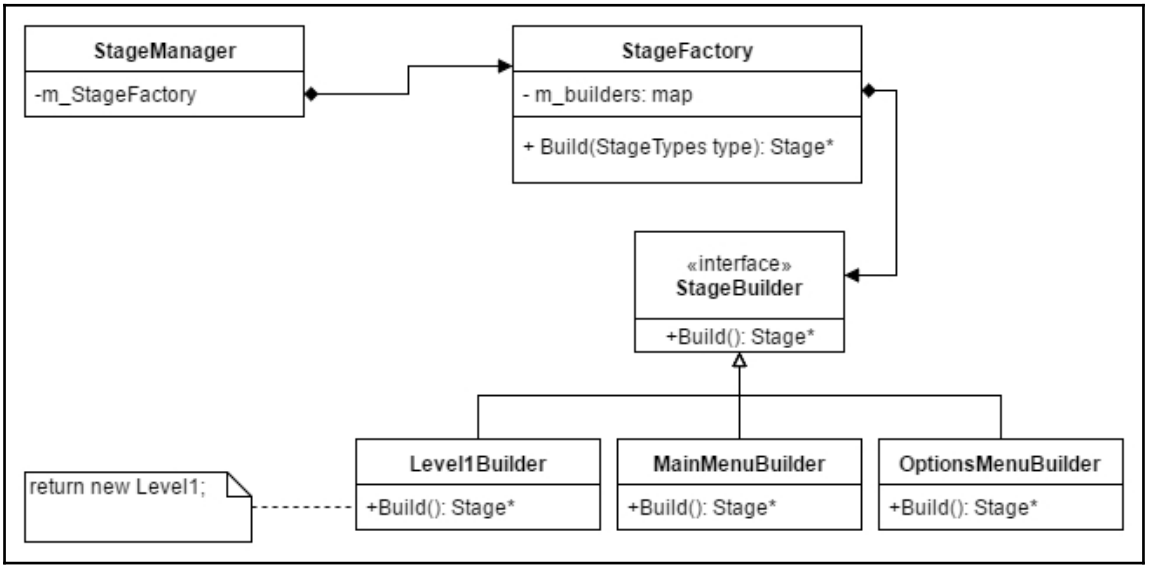

AstroShot

Chapter 5:
Decoupling Code via the Factory Method Pat tern

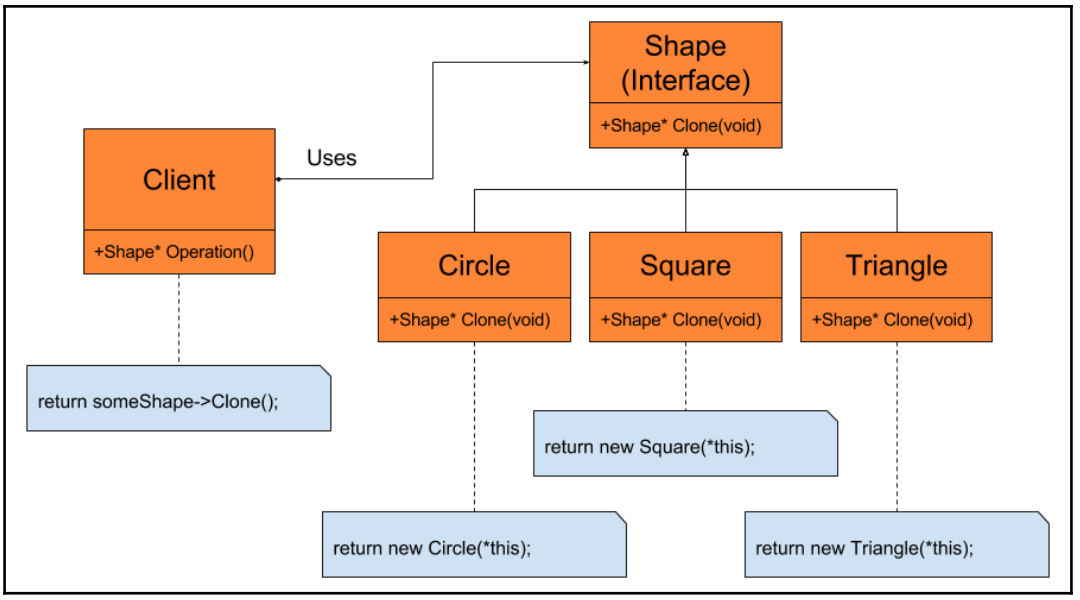




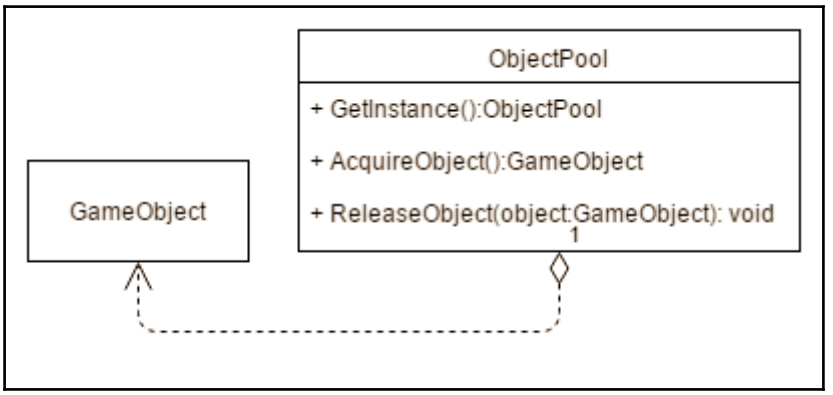

Stage
(abstraction)
StageFactory
(abstraction)
+Stage* Build()
Level2Factory
+Stage* Build()
Level2
return new Level2;

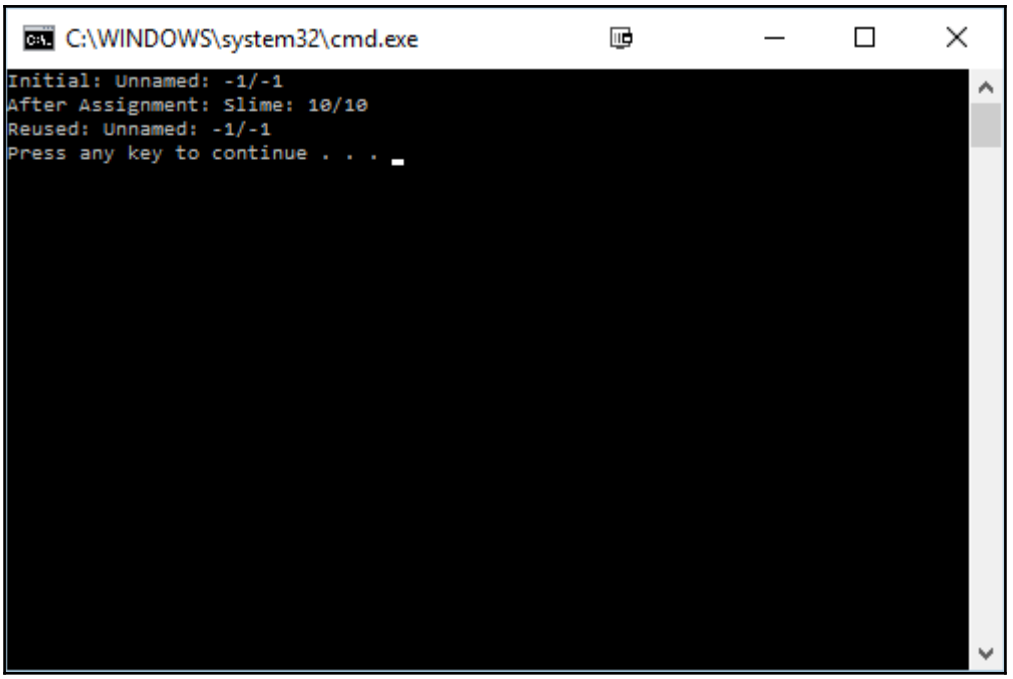

StageManager
-m_StageFactory
StageFactory
- m_builders: map
+ Build(StageTypes type): Stage*
«interface»
StageBuilder
+Build(): Stage*
Level1Builder
+Build(): Stage*
MainMenuBuilder
+Build(): Stage*
OptionsMenuBuilder
+Build(): Stage*
return new Level1;

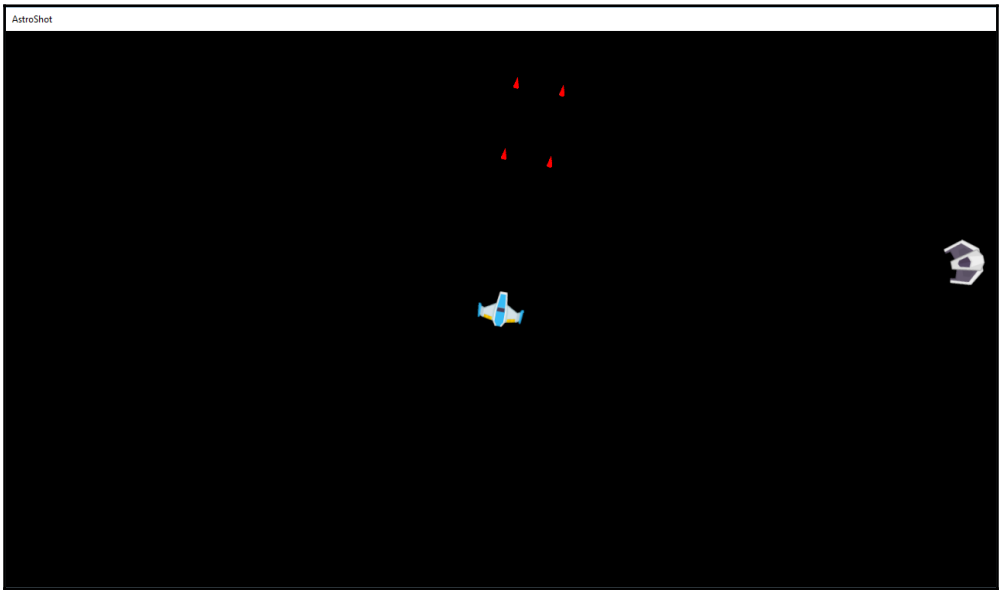
Chapter 6:
Creating Objects with the Prototype Pattern

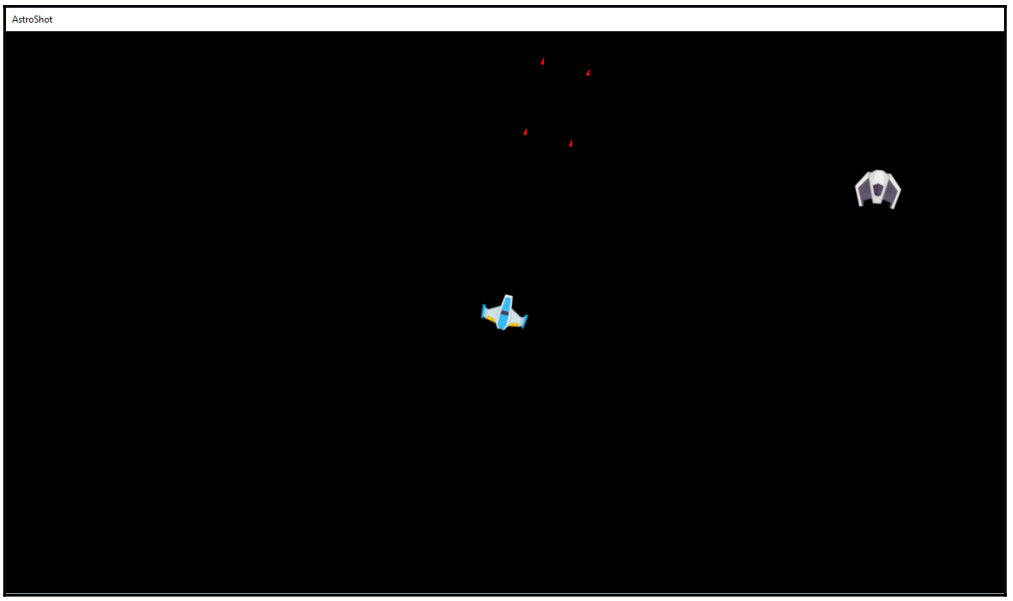

Shape
(Interface)
+Shape* Clone(void)
Client
+Shape* Operation()
Uses
Circle
+Shape* Clone(void)
Square
+Shape* Clone(void)
Triangle
+Shape* Clone(void)
return someShape->Clone();
return new Square(*this);
return new Circle(*this);
return new Triangle(*this);

Chapter 7:
Improving Performance with Object Pools

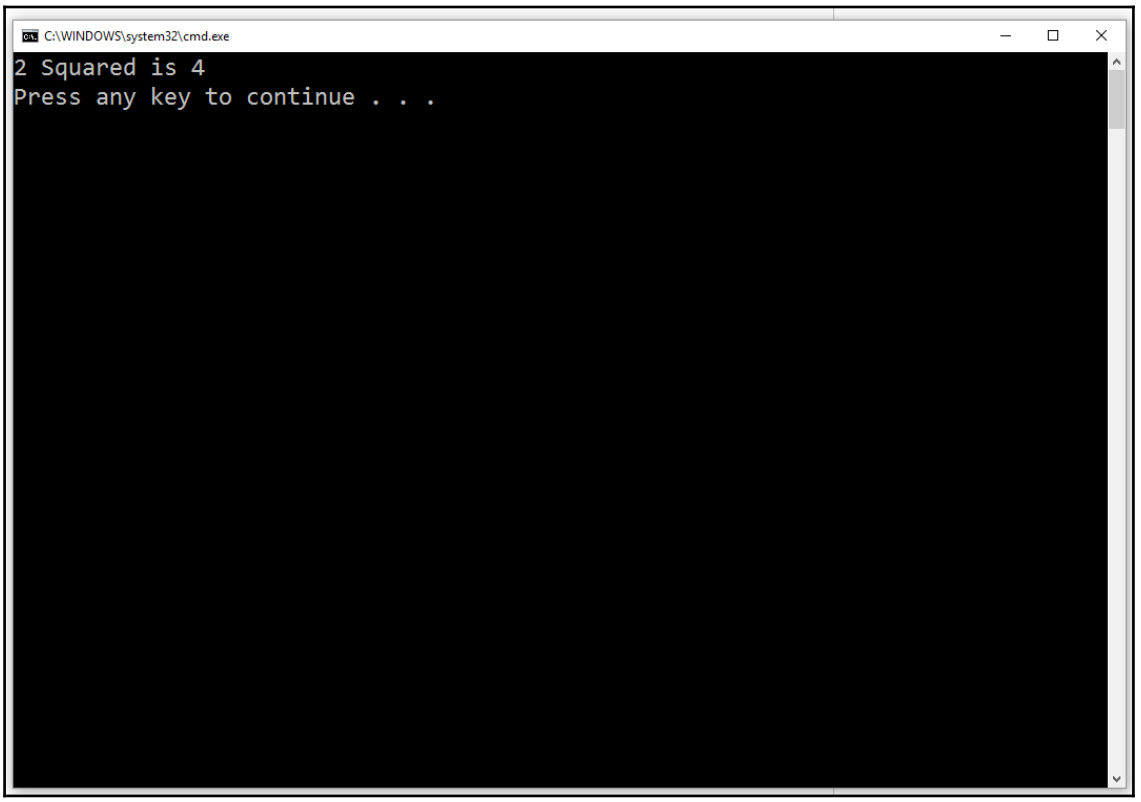


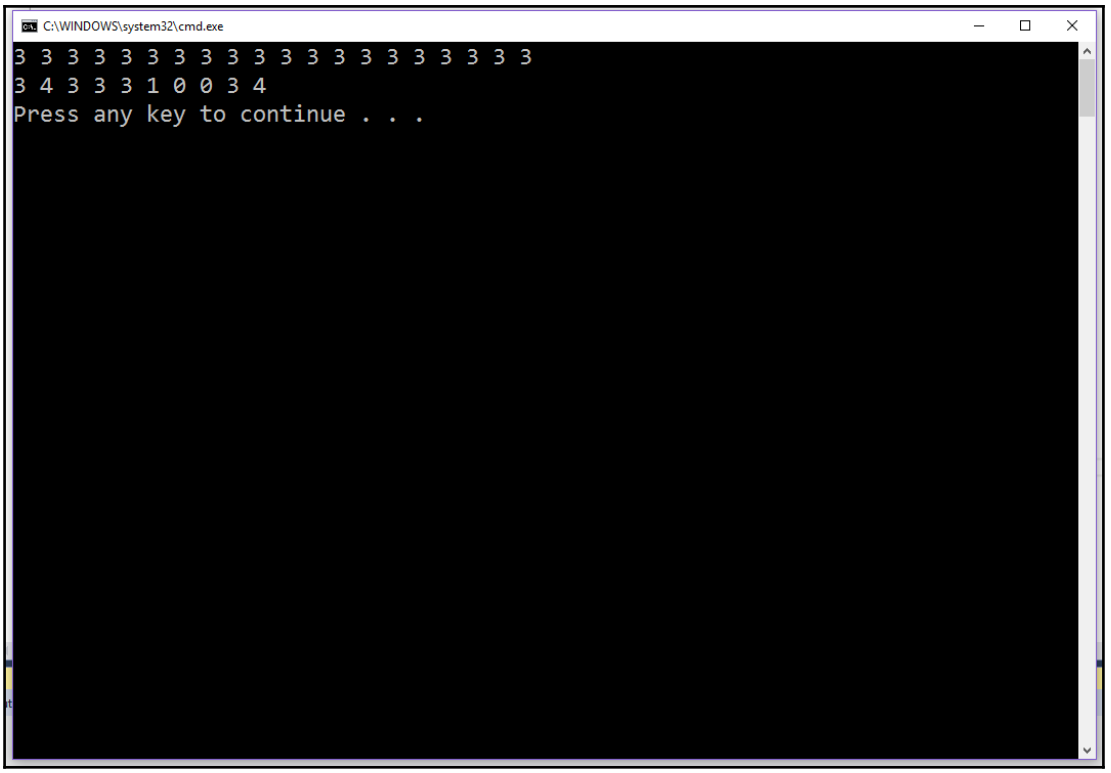

C:\WINDOWS\system32\cmd.exe
Initial: Unnamed: -1/-1
After Assignment: Slime: 10/10
Reused: Unnamed: -1/-1
Press any key to continue . . .

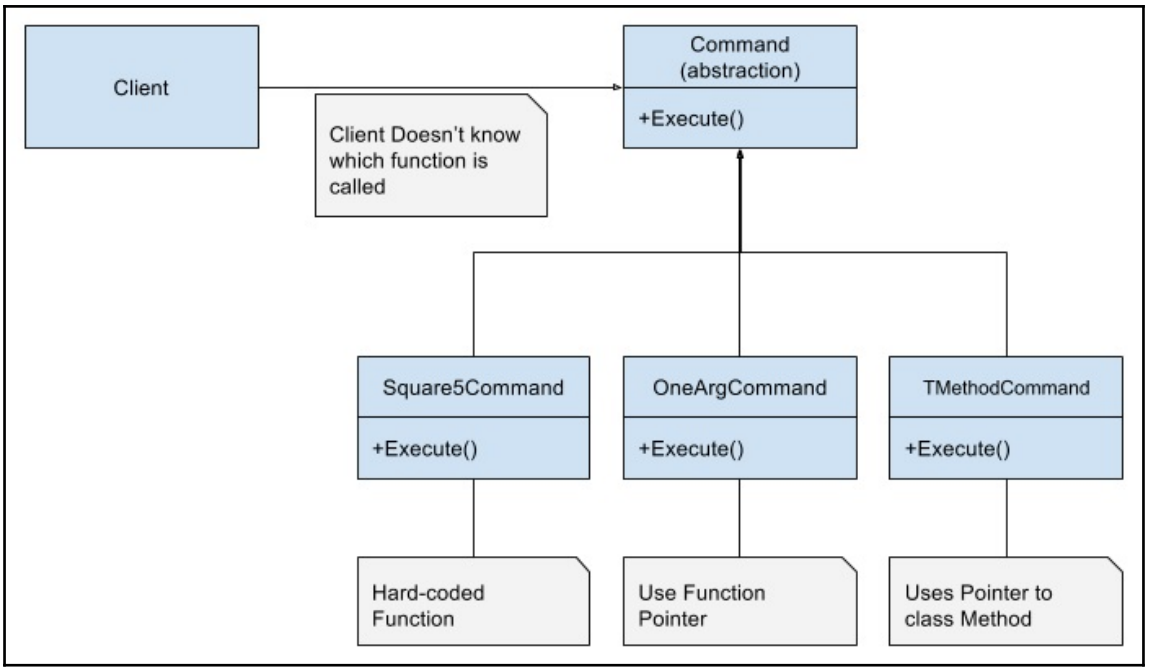

AstroShot


AstroShot

Chapter 8:
Controlling the UI via the Command Pattern

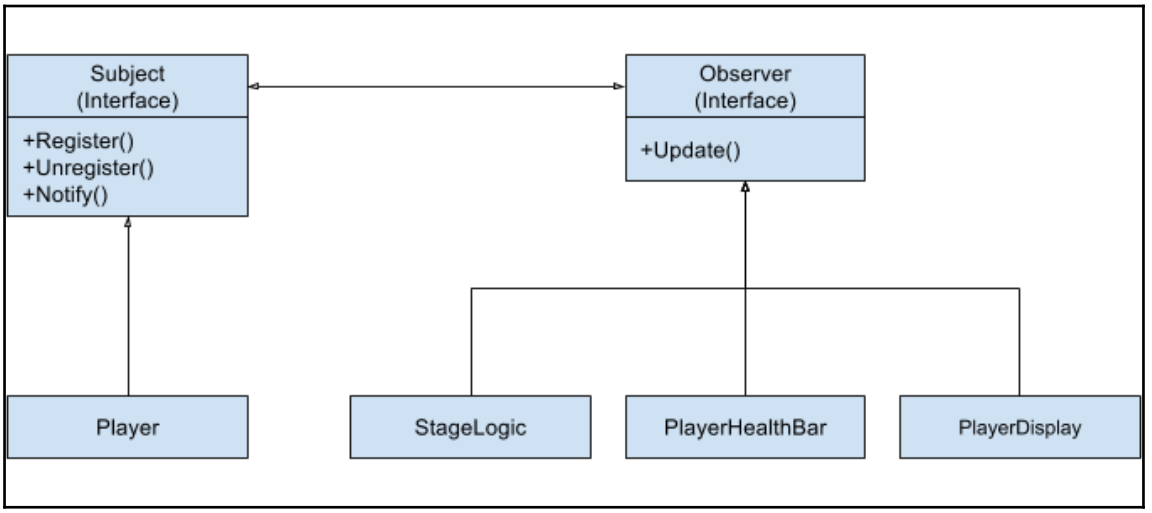



C:\WINDOWS\system32\cmd.exe
3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3
3 4 3 3 3 1 0 0 3 4
Press any key to continue . . .

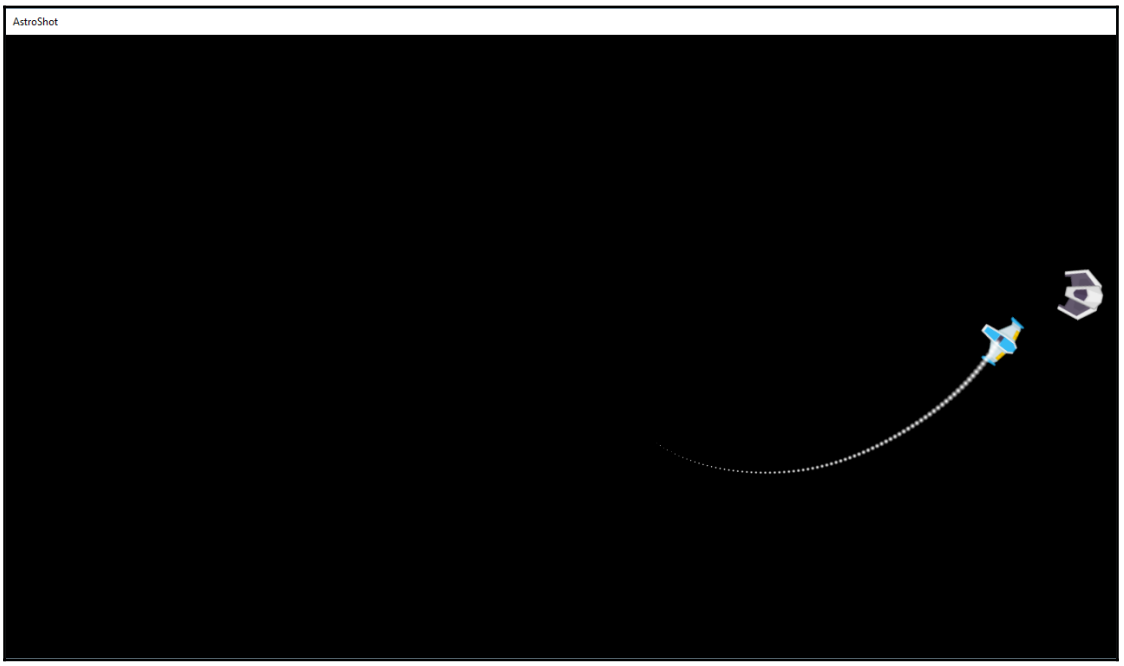

Client
Command
(abstraction)
+Execute()
Client Doesn't know
which function is
called
Square5Command
+Execute()
OneArgCommand
+Execute()
TMethodCommand
+Execute()
Hard-coded
Function
Use Function
Pointer
Uses Pointer to
class Method

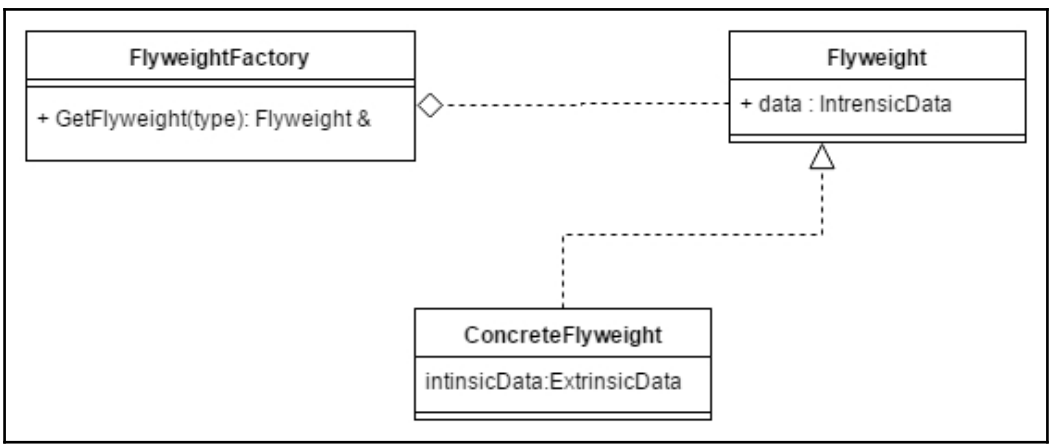

Astro Shot
Play
Options
Quit

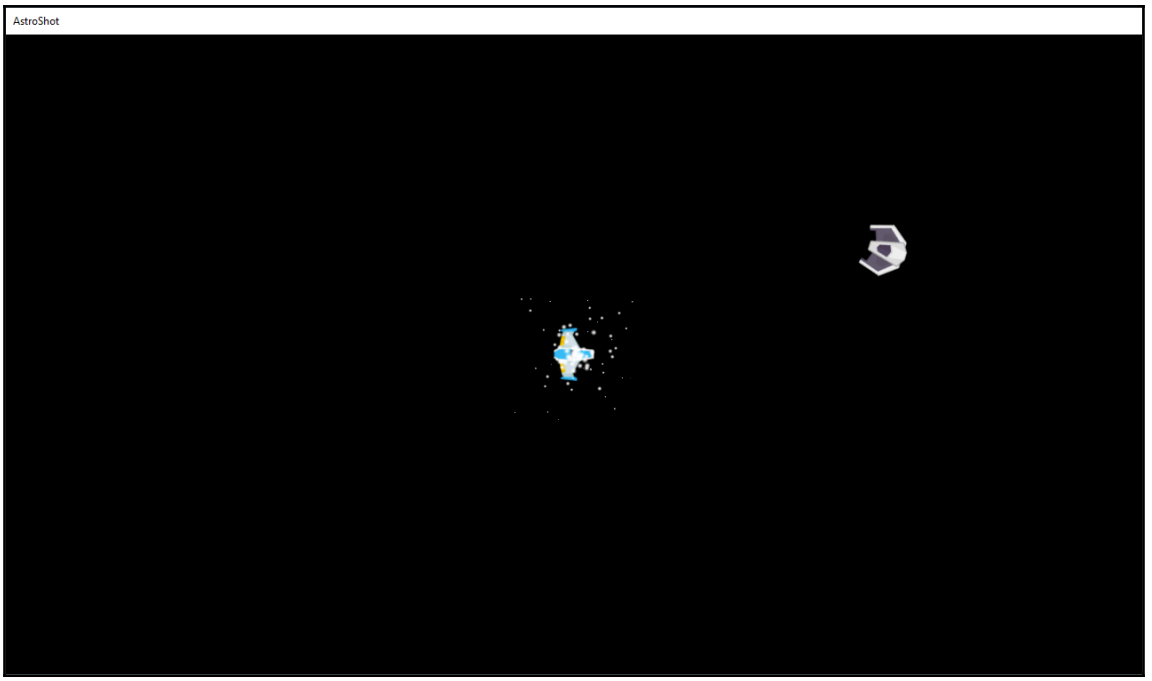
Chapter 9:
Decoupling Gameplay via the Observer Patte rn



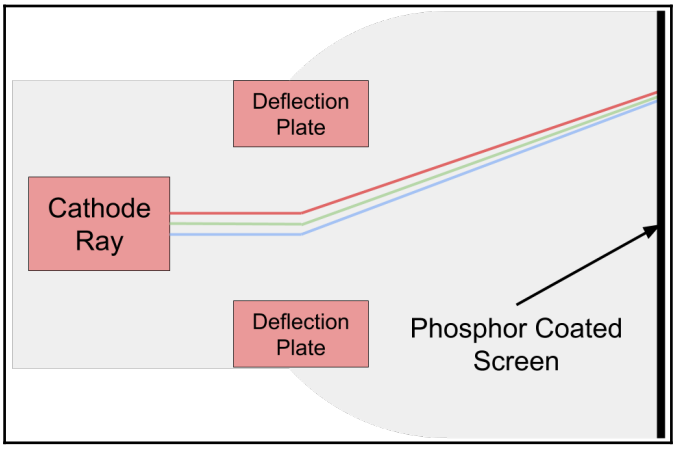
Chapter 10:
Sharing Objects with the Flyweight Pattern

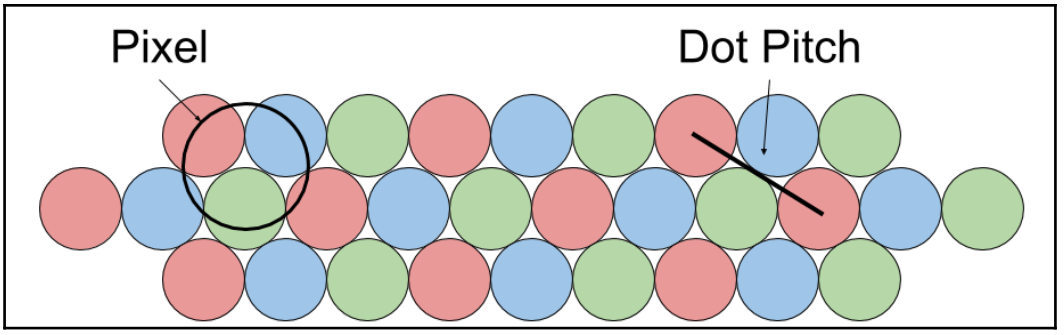


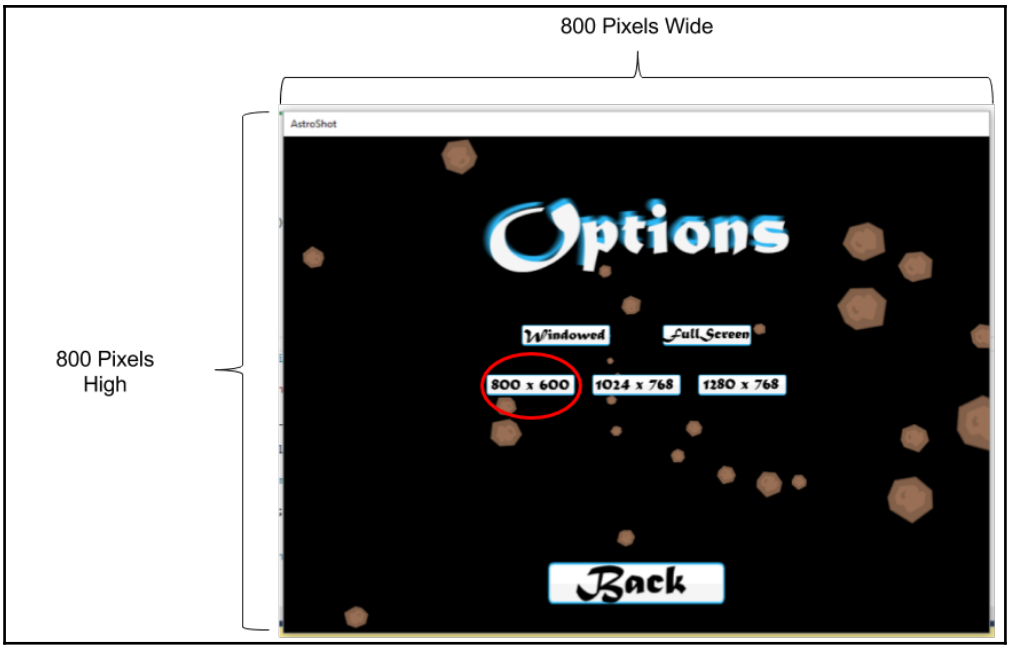


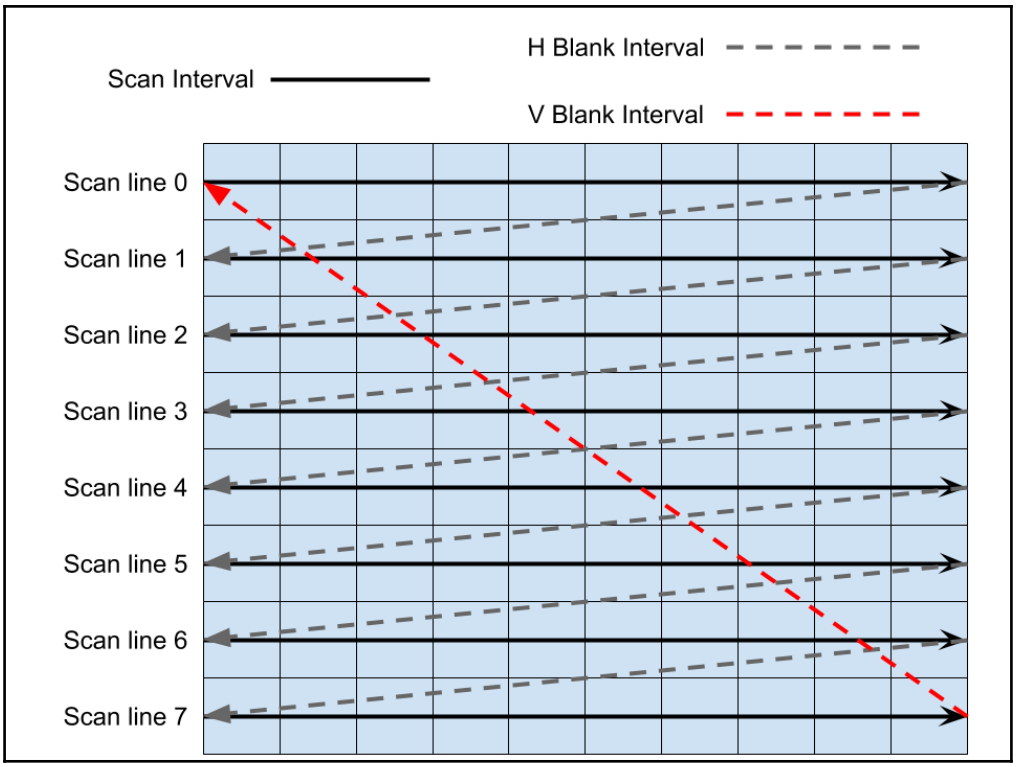

AstroShot

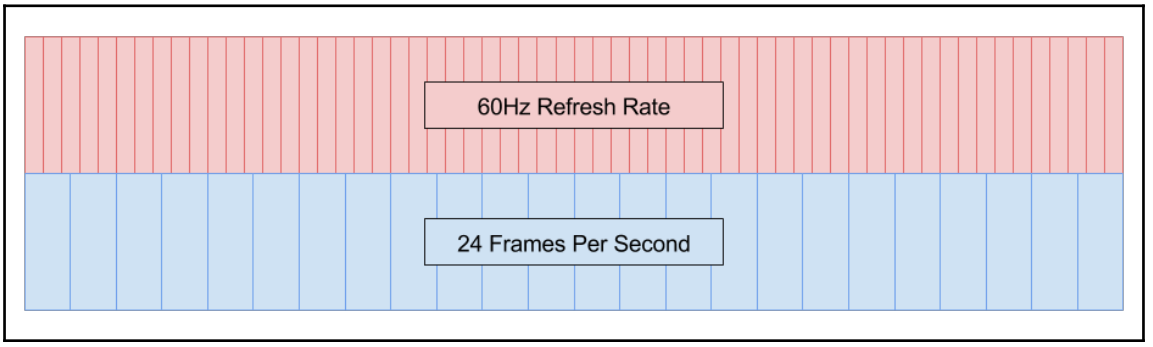
Chapter 11:
Understanding Graphics and Animation

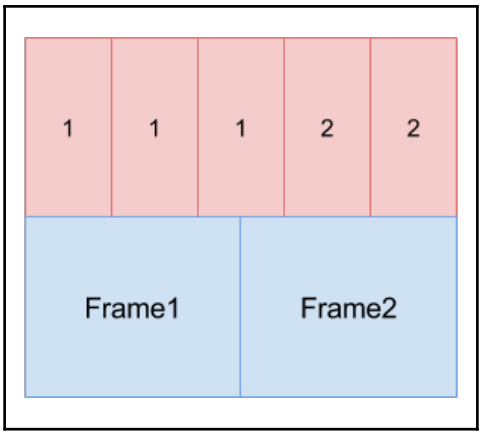


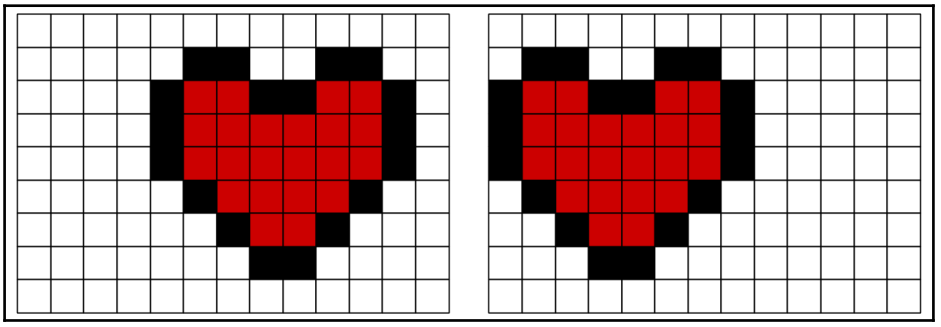


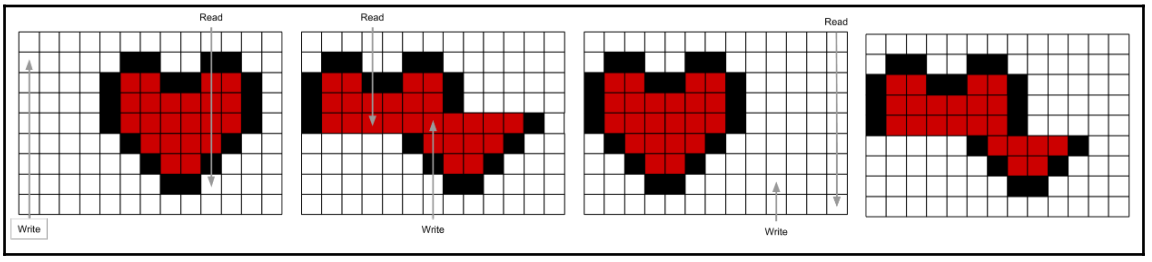

800 Pixels Wide
800 Pixels High
AstroShot
Options
Windowed
Full Screen
800 x 600
1024 x 768
1280 x 768
Back

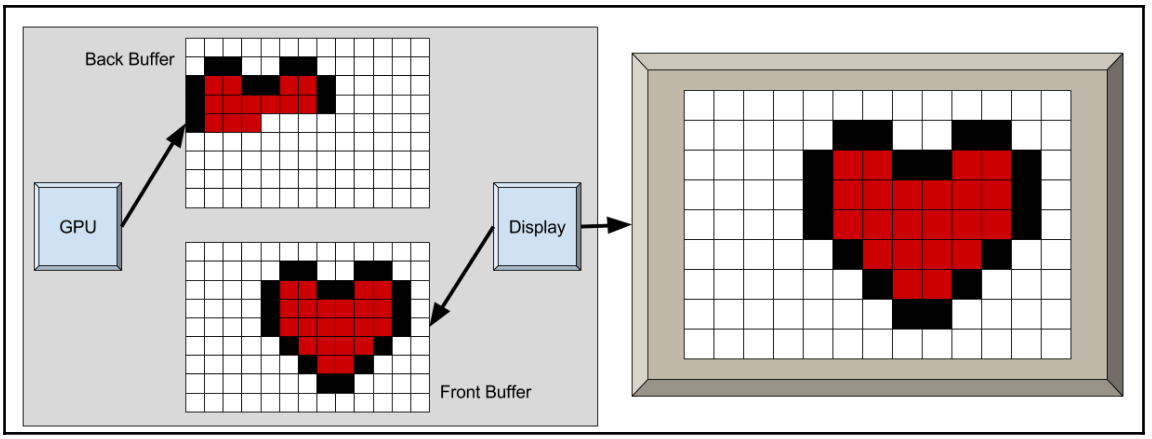

H Blank Interval
Scan Interval
V Blank Interval
Scan line 0
Scan line 1
Scan line 2
Scan line 3
Scan line 4
Scan line 5
Scan line 6
Scan line 7

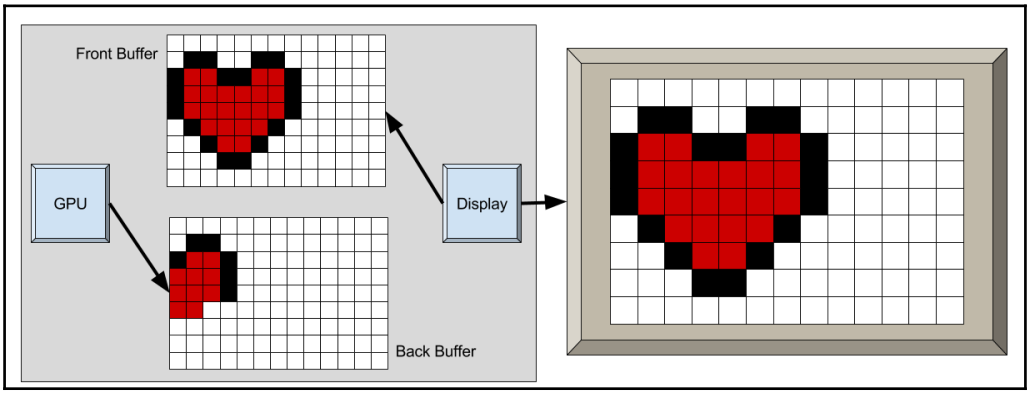

60Hz Refresh Rate
24 Frames Per Second

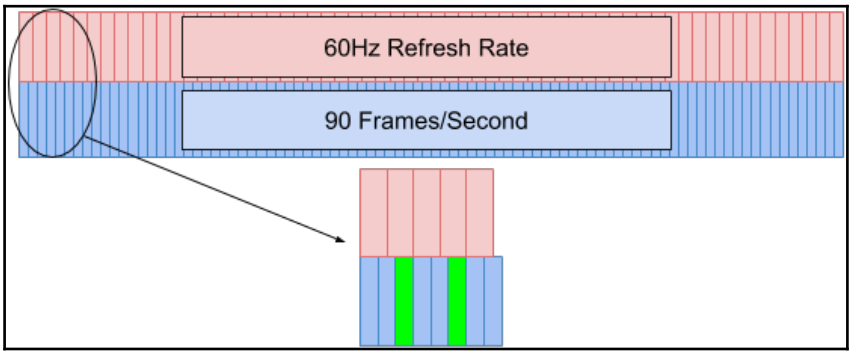

1
1
1
2
2
Frame1
Frame2



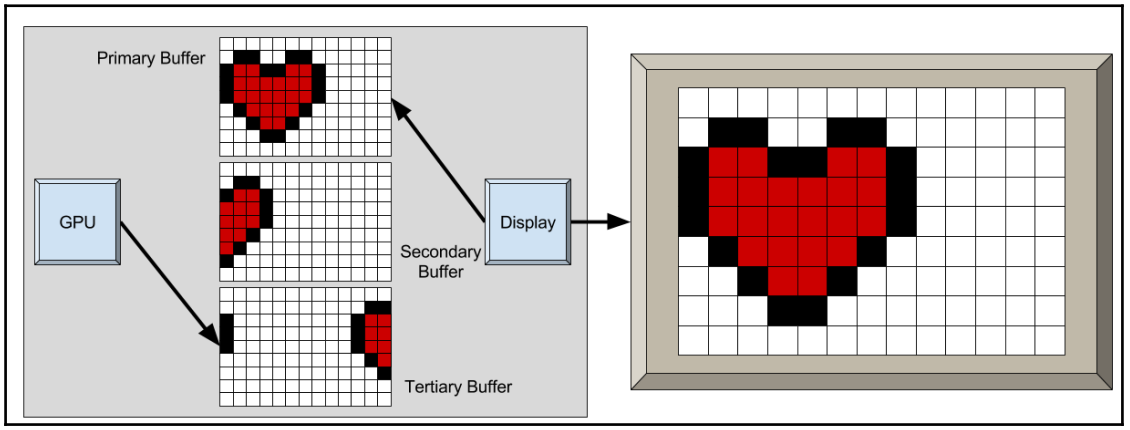

Read
Write
Read
Write
Read
Write

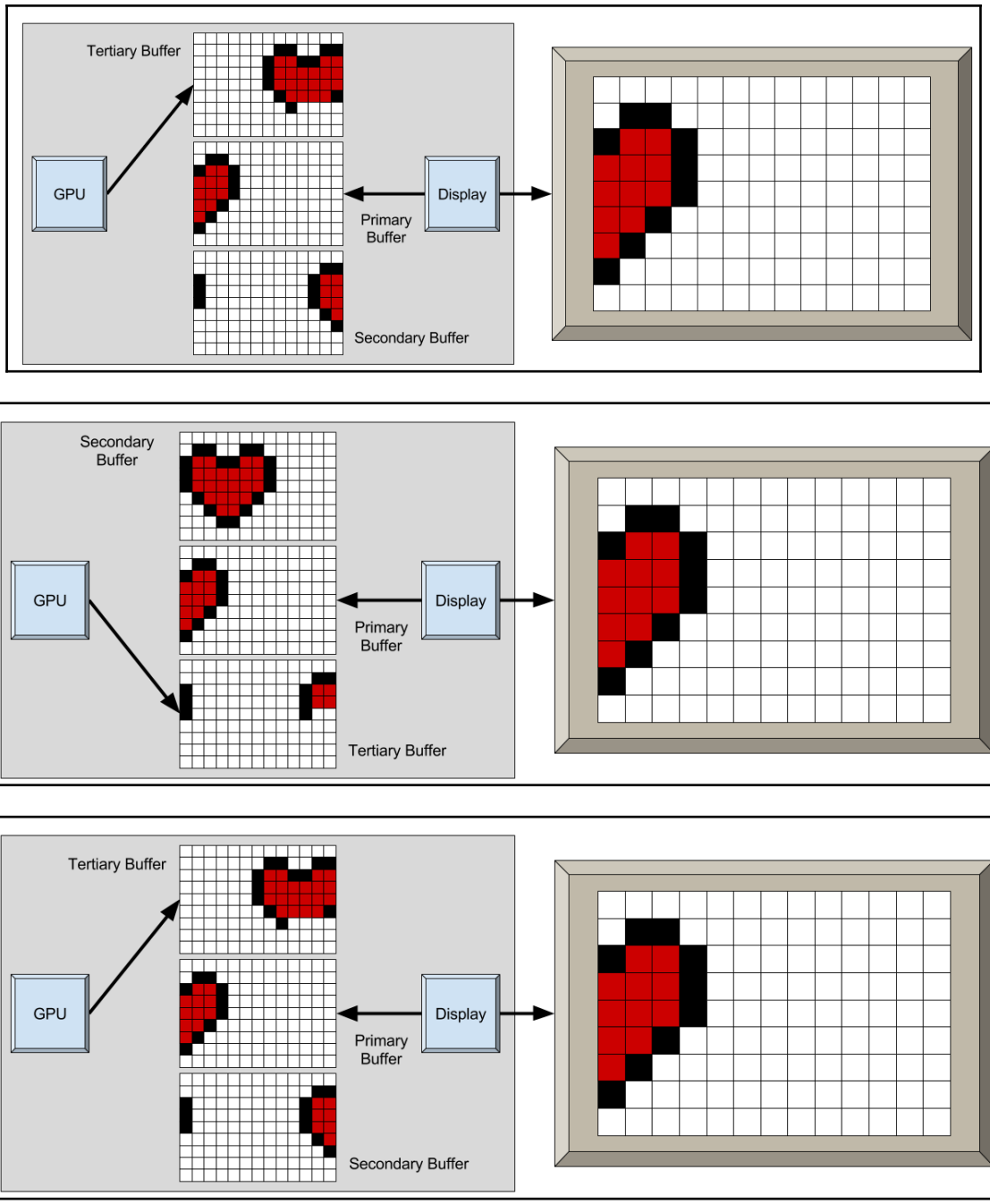

Back Buffer
GPU
Display
Front Buffer


Front Buffer
GPU
Display
Back Buffer


60Hz Refresh Rate
90 Frames/Second

Time (in Seconds)	Back Buffer	Front Buffer/Display
0.0	Frame 1 (Working)	Blank
1/60 = 0.0167(Monitor Refresh MISS)	Frame 1 (Working)	Blank
1/50 = 0.02(Game Update)	Frame 1 (Done)	Blank
2/60 = 0.0334(Monitor Refresh OK)	Frame 2 (Working)	Frame 1
3/60 = 0.0501(Monitor Refresh MISS)	Frame 2 (Working)	Frame 1
2/60 + 1/50 = 0.0534(Game Update)	Frame 2 (Done)	Frame 1
4/60 = 0.0668(Monitor Refresh OK)	Frame 3 (Working)	Frame 2
5/60 = 0.0835(Monitor Refresh MISS)	Frame 3 (Working)	Frame 2
4/60 + 1/50 = 0.0868(Game Update)	Frame 3 (Done)	Frame 2
6/60 = 0.1002(Monitor Refresh OK)	Frame 4 (Working)	Frame 3




Tertiary Buffer
GPU
Display
Primary Buffer
Secondary Buffer
Secondary Buffer
GPU
Display
Primary Buffer
Tertiary Buffer
Tertiary Buffer
GPU
Display
Primary Buffer
Secondary Buffer

Time (in Seconds)	Tertiary Buffer	Back Buffer	Front Buffer/Display
0.0	Idle	Frame 1 (Working)	Blank
1/60 = 0.0167(Monitor Refresh MISS)	Idle	Frame 1 (Working)	Blank
1/50 = 0.02(Game Update)	Frame 2 (Working)	Frame 1 (Done)	Blank
2/60 = 0.0333(Monitor Refresh OK)	Frame 2 (Working)	Idle	Frame 1
2/50 = 0.04 (Game Update)	Frame 3 (Working)	Frame 2 (Done)	Frame 1
3/60 = 0.05(Monitor Refresh OK)	Frame 3 (Working)	Idle	Frame 2
3/50 = 0.06(Game Update)	Frame 4 (Working)	Frame 3 (Done)	Frame 2
4/60 = 0.0667(Monitor Refresh OK)	Frame 4 (Working)	Idle	Frame 3
4/50 = 0.08(Game Update)	Frame 5 (Working)	Frame 4 (Done)	Frame 3
5/60 = 0.0833(Monitor Refresh OK)	Frame 5 (Working)	Idle	Frame 4
5/50 = 0.10(Game Update)	Frame 6 (Working)	Frame 5 (Done)	Frame 4
6/60 = 0.10(Monitor Refresh OK)	Frame 6 (Working)	Idle	Frame 5
7/60 = 0.117(Monitor Refresh MISS)	Frame 6 (Working)	Idle	Frame 5
6/50 = 0.12(Game Update)	Frame 7 (Working)	Frame 6 (Done)	Frame 5
8/60 = 0.133(Monitor Refresh OK)	Frame 7 (Working)	Idle	Frame 6
7/50 = 0.14(Game Update)	Frame 8 (Working)	Frame 7 (Done)	Frame 6

$$\boxed{\frac{dx}{dt} = v}$$

$$\boxed{\frac{x1 - x0}{dt} = v}$$

$$\boxed{x1 - x0 = v * dt}$$

$$\boxed{x1 = x0 + v * dt}$$

$$\boxed{\frac{dv}{dt} = a}$$

$$\boxed{\frac{v1 - v0}{dt} = a}$$

$$\boxed{v1 - v0 = a * dt}$$

$$\boxed{v1 = v0 + a * dt}$$

$$\boxed{F = ma}$$

$$\boxed{a = F/m}$$

$$\boxed{x1 = x0 + v * dt}$$

$$\boxed{v1 = v0 + a * dt}$$

$$\boxed{a = Force/mass}$$

$$\boxed{p = \frac{1}{2}at^2 + v_o t + p_0}$$

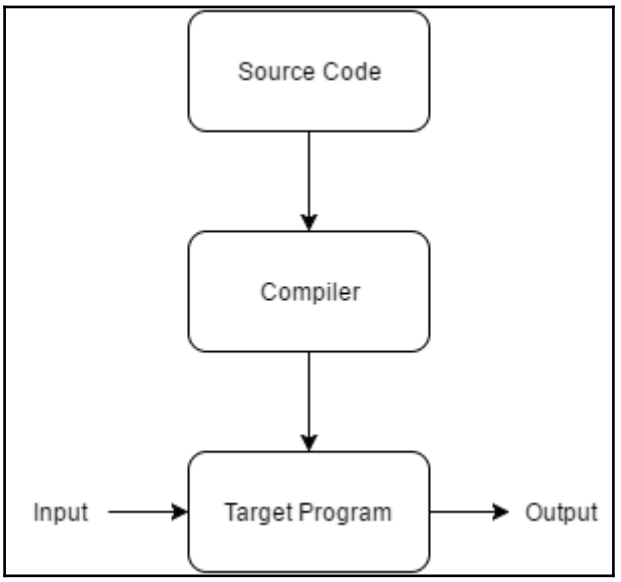
$$\boxed{distance = \frac{1}{2}at^2 + 0 + 0}$$

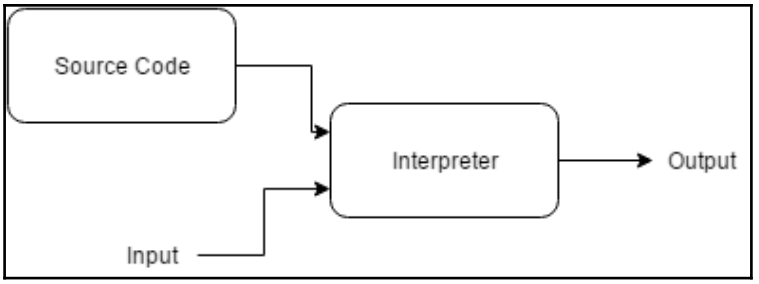
$$\boxed{distance = \frac{1}{2}(10) * (10 * 10)}$$

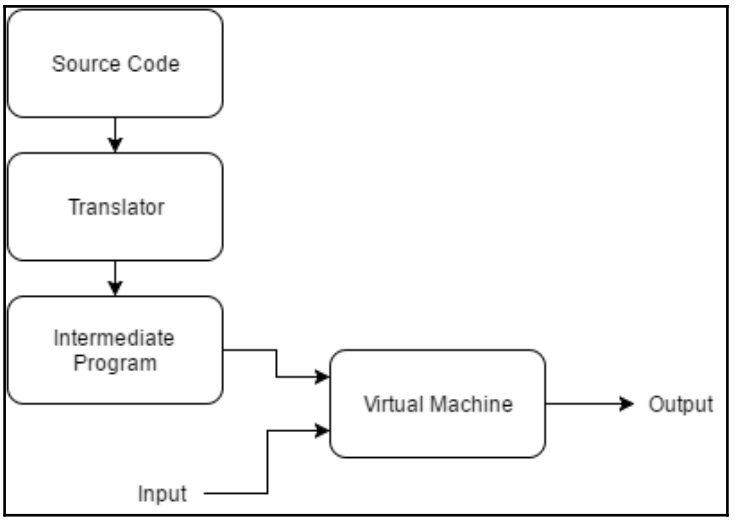
$$\boxed{distance = 10 * (100)}$$

$$\boxed{distance = 1000}$$

Chapter 12: Best Practices






Source Code
Translator
Intermediate Program
Virtual Machine
Output
Input