

# Game Engine Development II

Week1

Hooman Salamat





# Instructor

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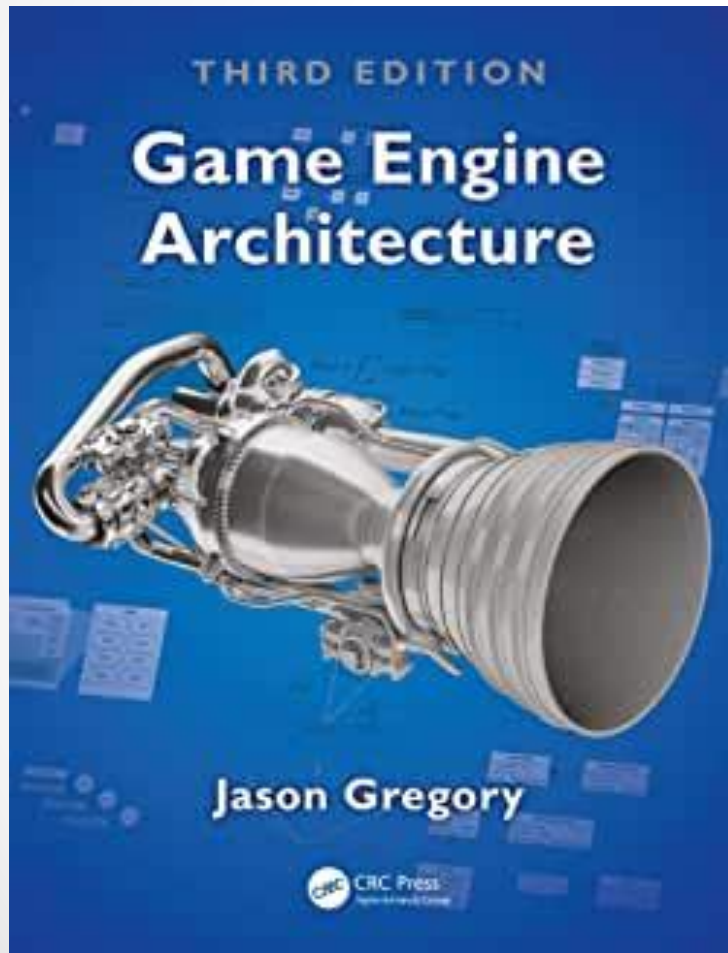
# Assessment

- 2x Assignments 20%
-  
- 1x Midterm Exam 30%
- 
- 1x Final Project 50%
- 

# Course Materials

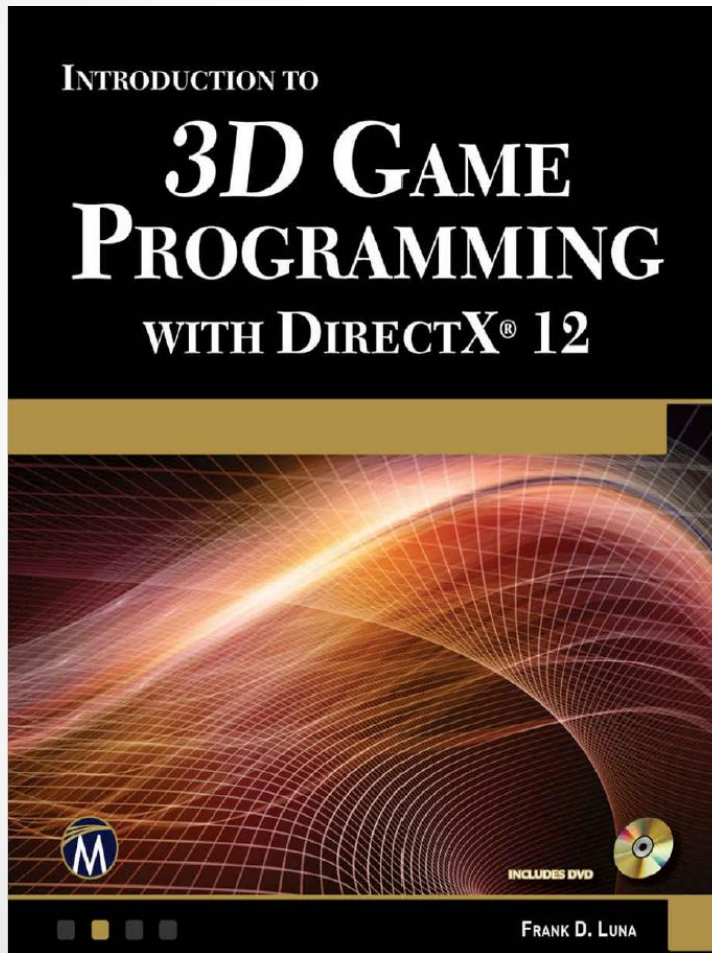
- <https://github.com/hsalamat/GameEngineDevelopment2>

# Textbook 1



- Game Engine Architecture, Third Edition
- By: Jason Gregory
- ISBN-13: 978-1-1380-3545-4
- Publisher: CRC Press

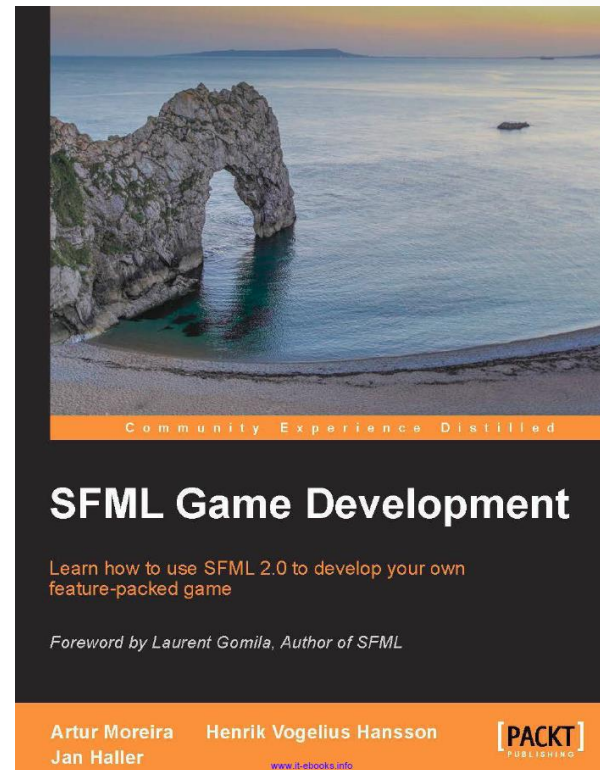
# Textbook2



- Introduction to 3D Game Programming With DirectX12
- By: Frank D. Luna
- ISBN: 9781942270065
- Publisher: Mercury

# Textbook3

- SFML Game Development
- Google it
- <https://www.packtpub.com/game-development/sfml-game-development>



# Objectives

- Be introduced to SFML or Simple and Fast Multimedia Library, which is a C++ framework
- Learn how to download and install SFML
- Explore an example and see the format of an SFML program
- Examine the Game class of an SFML program



# SFML Tutorials

- Before we begin, here is a link to the main SFML tutorial site:
  - <https://www.sfml-dev.org/tutorials/2.5/>
  - <https://www.sfml-dev.org/tutorials/2.5/start-vc.php>
- Here you can also learn how to setup SFML for your version of Visual Studio – which we will go through in detail this week
- <http://sfml-hooman.blogspot.ca/2017/12/setting-up-sfml-242-in-visual-studio.html>

# Visual Studio Tips!

- If you choose to link the dynamic libraries, i.e.: *sfml-graphics.lib*, *sfml-window.lib* and *sfml-system.lib*, for **Release** or... *sfml-graphics-d.lib*, *sfml-window-d.lib* and *sfml-system-d.lib* for **Debug**...
  - **Do NOT add SFML\_STATIC to the Preprocessor section**
  - **Remember to copy and paste the appropriate DLLs from bin to the same folder as your new .exe!**
- You can use `main()` instead of `WinMain()` even after choosing a Windows Application by including the appropriate *sfml-main.lib* or *sfml-main-d.lib* in the Linker->Input

# Intro to SFML

- SFML is a library which adds multimedia content to your programs built in C++
- Five modules:
  - System
  - Window
  - Graphics
  - Audio
  - Network
- We'll start the course off by working with the first three for a few weeks

# System Module

- The system is the core module
  - All other modules are built upon it
- It provides vector classes (2D and 3D), clocks, threads, Unicode strings and other things
- To use in your program:
  - Include sfml-system.lib in your Linker->Input
  - Or sfml-system-d.lib for Debug configuration

# Window Module

- This module allows you to create application windows as well as collecting user input, such as mouse movement or key presses
  - You've seen Windows Application in Visual Studio before, but thus far your programs have been exclusively Console Applications
- To use in your program:
  - Include sfml-window.lib in your Linker->Input
  - Or sfml-window-d.lib for Debug configuration

# Graphics Module

- The Graphics module allows you to include all functionality related to 2D rendering
  - Using images, texts, shapes and colors
- To use in your program:
  - Include sfml-graphics.lib in your Linker->Input
  - Or sfml-graphics-d.lib for Debug configuration

# Audio Module

- The Audio module is, of course, provided so that you can add sounds to your game
  - Covers sound effects and music tracks
- To use in your program:
  - Include sfml-audio.lib in your Linker->Input
  - Or sfml-audio-d.lib for Debug configuration

# Network Module

- Yes! SFML has a Network module that will allow you to setup multiplayer games
  - Includes everything you need to communicate over a LAN or the Internet using protocols such as HTTP and FTP
- And yes, we will be covering that in this course!
- To use in your program:
  - Include sfml-network.lib in your Linker->Input
  - Or sfml-network-d.lib for Debug configuration



# SFML “Hello World”

```
#include <SFML/Graphics.hpp>

int main()
{
    sf::RenderWindow window(sf::VideoMode(200, 200), "Hello World!");
    sf::CircleShape shape(100.f);
    shape.setFillColor(sf::Color::Green);

    while (window.isOpen())
    {
        sf::Event event;
        while (window.pollEvent(event))
        {
            if (event.type == sf::Event::Closed)
                window.close();
        }

        window.clear();
        window.draw(shape);
        window.display();
    }

    return 0;
}
```

# Tips for Good Coding

- By this point, you should know how to code efficiently and use object-oriented features
- But let's reiterate some good concepts:
- Modularity
  - Keep your code separated into small pieces that perform a particular function
    - Separated into headers and implementation files
    - This will allow you to reuse that code easily, not only in the current program but other programs as well

# Tips for Good Coding (cont'd.)

- Abstraction
  - Encapsulate functionality into classes and functions
  - This will prevent code duplications
  - Functions go way back to first term
- Consistency
  - Choose your coding style and stick to it so that it can be read easily and is more professional
  - Usually, this refers to how you use whitespace
  - Also how you use body braces, i.e.: { }

# Abstraction into Practice

- To get you more familiar with SFML, we're going to take a minimal example on the next slide and convert the code into a class
- Through this, you should be able to see how we can break down the functionality into pieces and demonstrate how those pieces work together
- So let's get started!

# Minimal Example

```
#include <SFML/Graphics.hpp>

int main()
{
    sf::RenderWindow window(sf::VideoMode(640,
    480), "SFML Application");
    sf::CircleShape shape;
    shape.setRadius(40.f);
    shape.setPosition(100.f, 100.f);
    shape.setFillColor(sf::Color::Cyan);
    while (window.isOpen())
    {
        sf::Event event;
        while (window.pollEvent(event))
        {
            if (event.type == sf::Event::Closed)
                window.close();
        }
        window.clear();
        window.draw(shape);
        window.display();
    }
}
```

# Game Class

```
class Game
{
    public:
        Game();
        void run();
    private:
        void processEvents();
        void update();
        void render();
    private:
        sf::RenderWindow mWindow;
        sf::CircleShape mPlayer;
};

int main()
{
    Game game;
    game.run();
}
```

# Game Implementation

```
Game::Game()  
: mWindow(sf::VideoMode(640, 480), "SFML Application"), mPlayer()  
{  
    mPlayer.setRadius(40.f);  
    mPlayer.setPosition(100.f, 100.f);  
    mPlayer.setFillColor(sf::Color::Cyan);  
}  
  
void Game::run()  
{  
    while (mWindow.isOpen())  
    {  
        processEvents();  
        update();  
        render();  
    }  
}
```

# Game Implementation (cont'd.)

```
void Game::processEvents()
{
    sf::Event event;
    while (mWindow.pollEvent(event))
    {
        if (event.type == sf::Event::Closed)
            mWindow.close();
    }
}

void Game::update()
{
}
```