Programming in the Real World

INTRODUCTION: FRAMEWORKS AND LIBRARIES

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```
drawPixel(10,10)
```

```
drawPixel(10,10)
```

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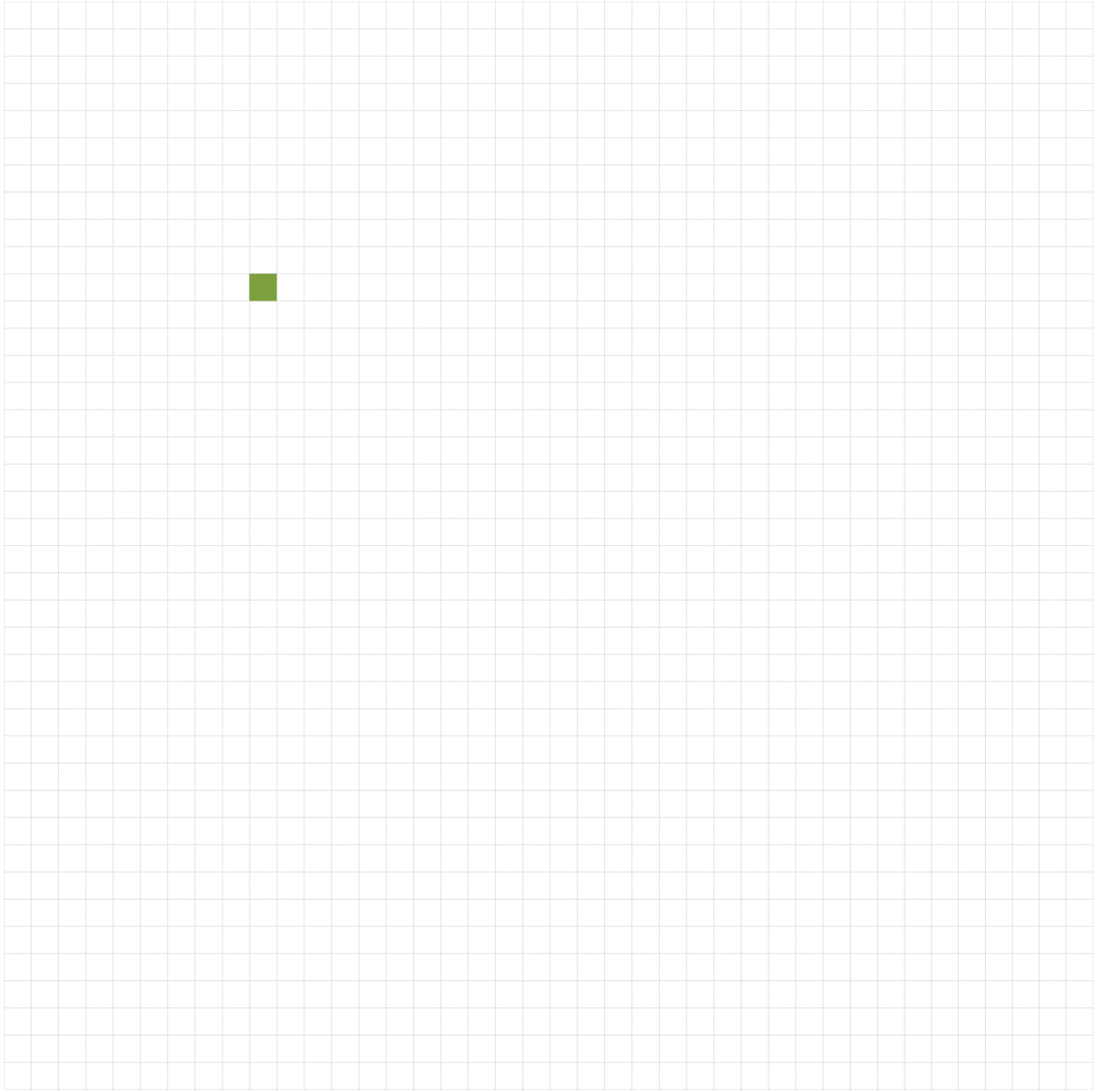
drawPixel(10,10)
```

```
for i in 10...30
    drawPixel(i,10)
end for
```



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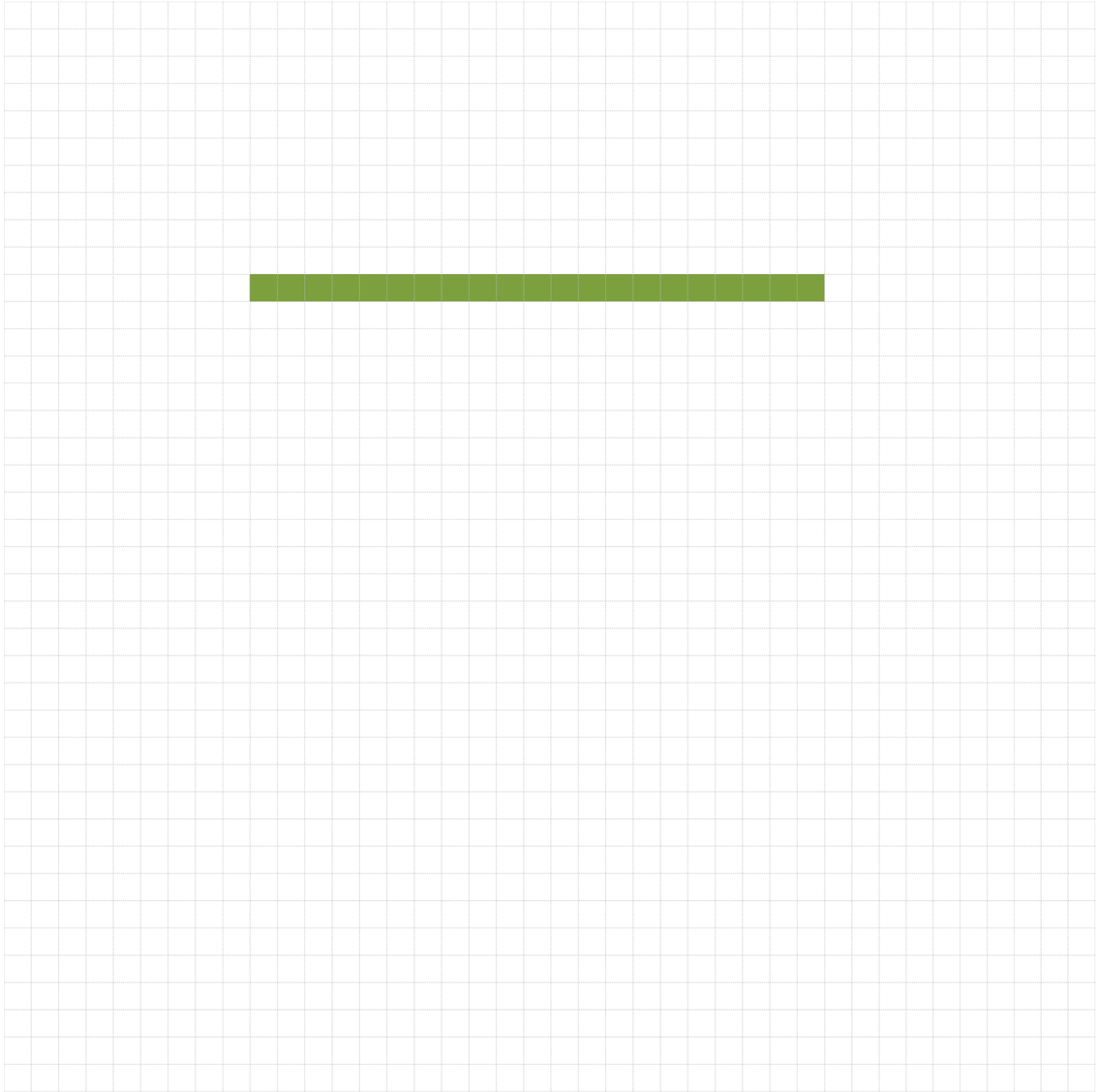
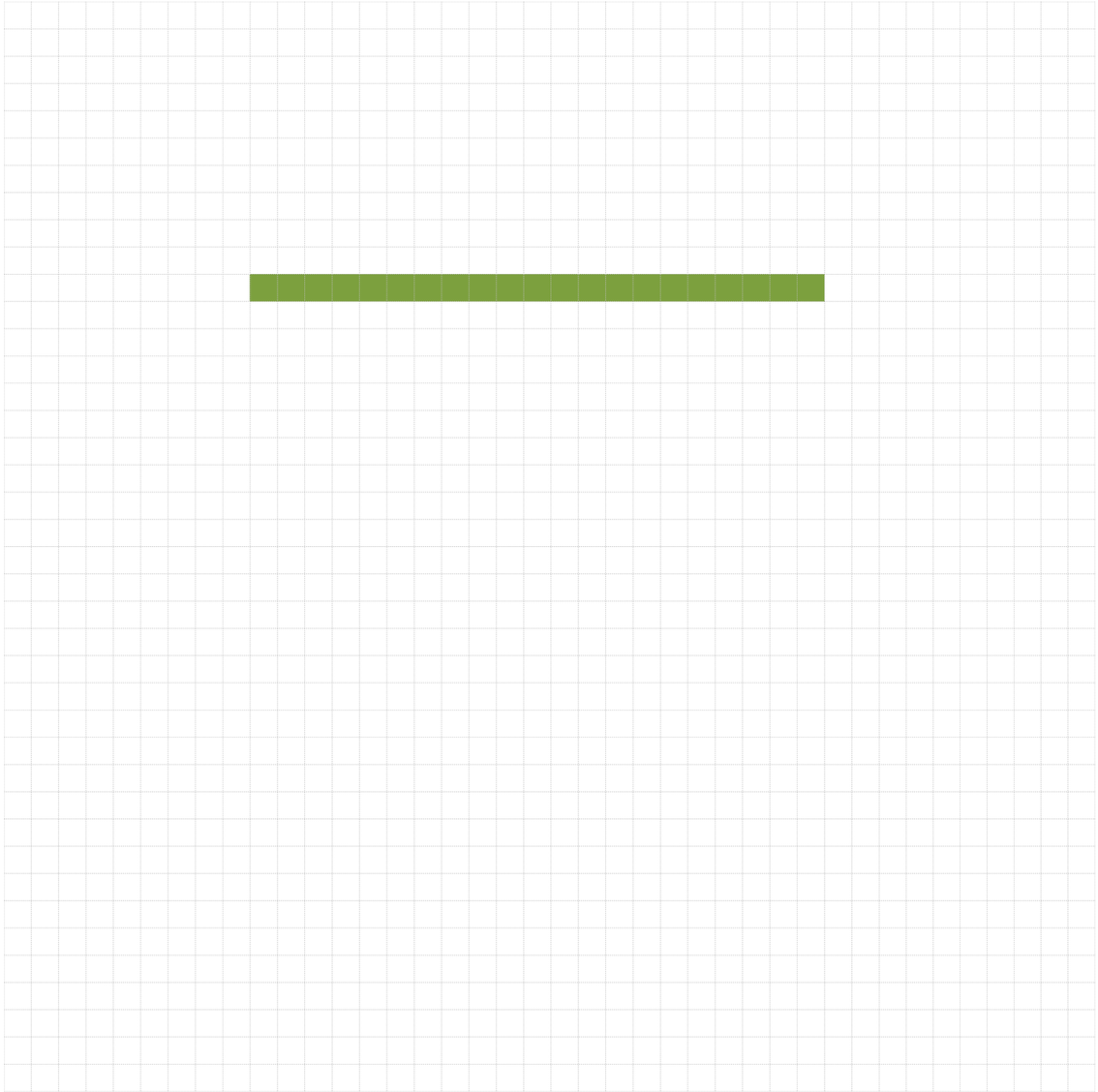


```
drawPixel(10,10)


func drawLine()
    for i in 10...30
       drawPixel(i,10)
    end for
end func
```

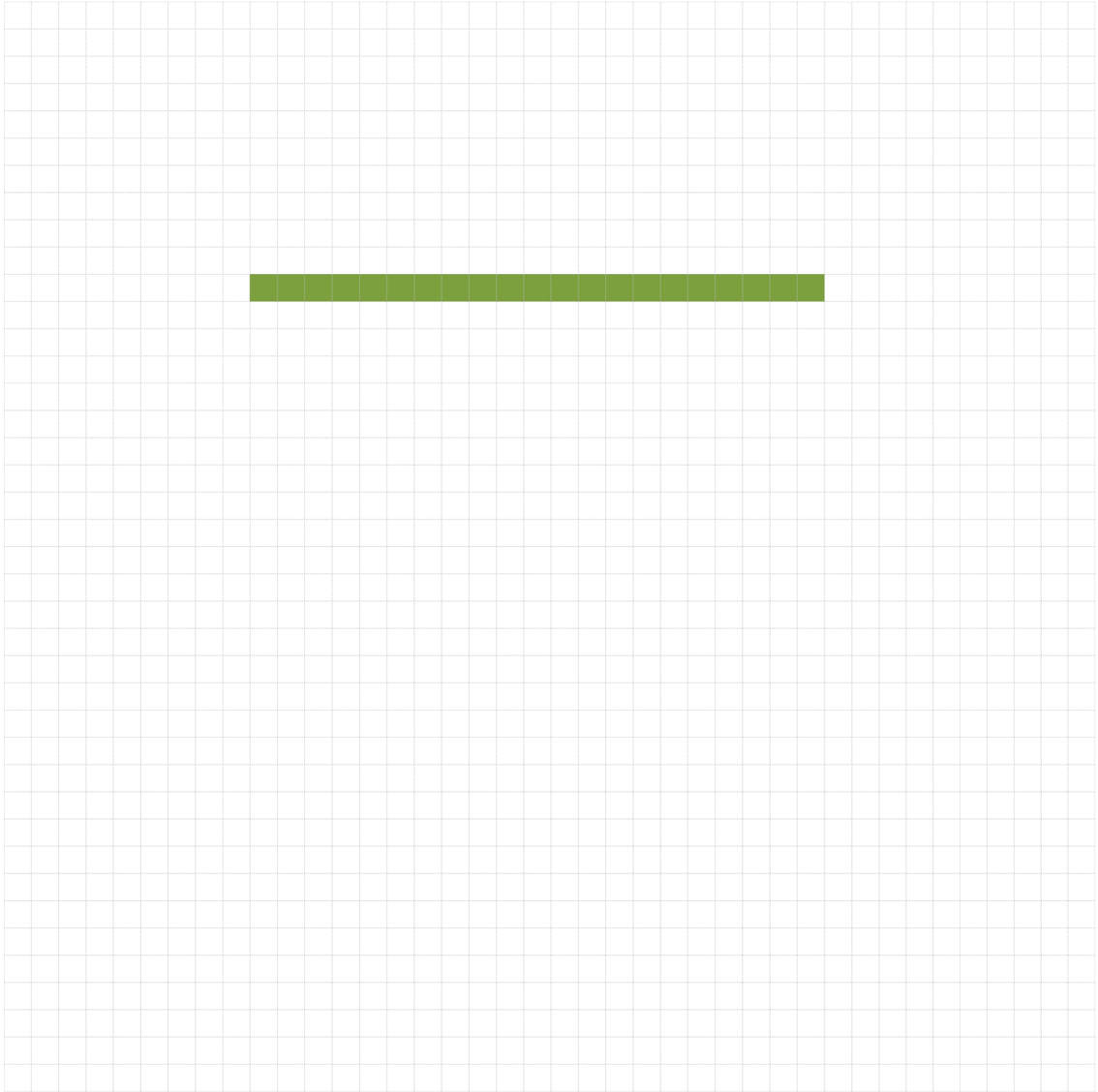


```
drawPixel(10,10)


func drawLine()
    for i in 10...30
        drawPixel(i,10)
    end for
end func



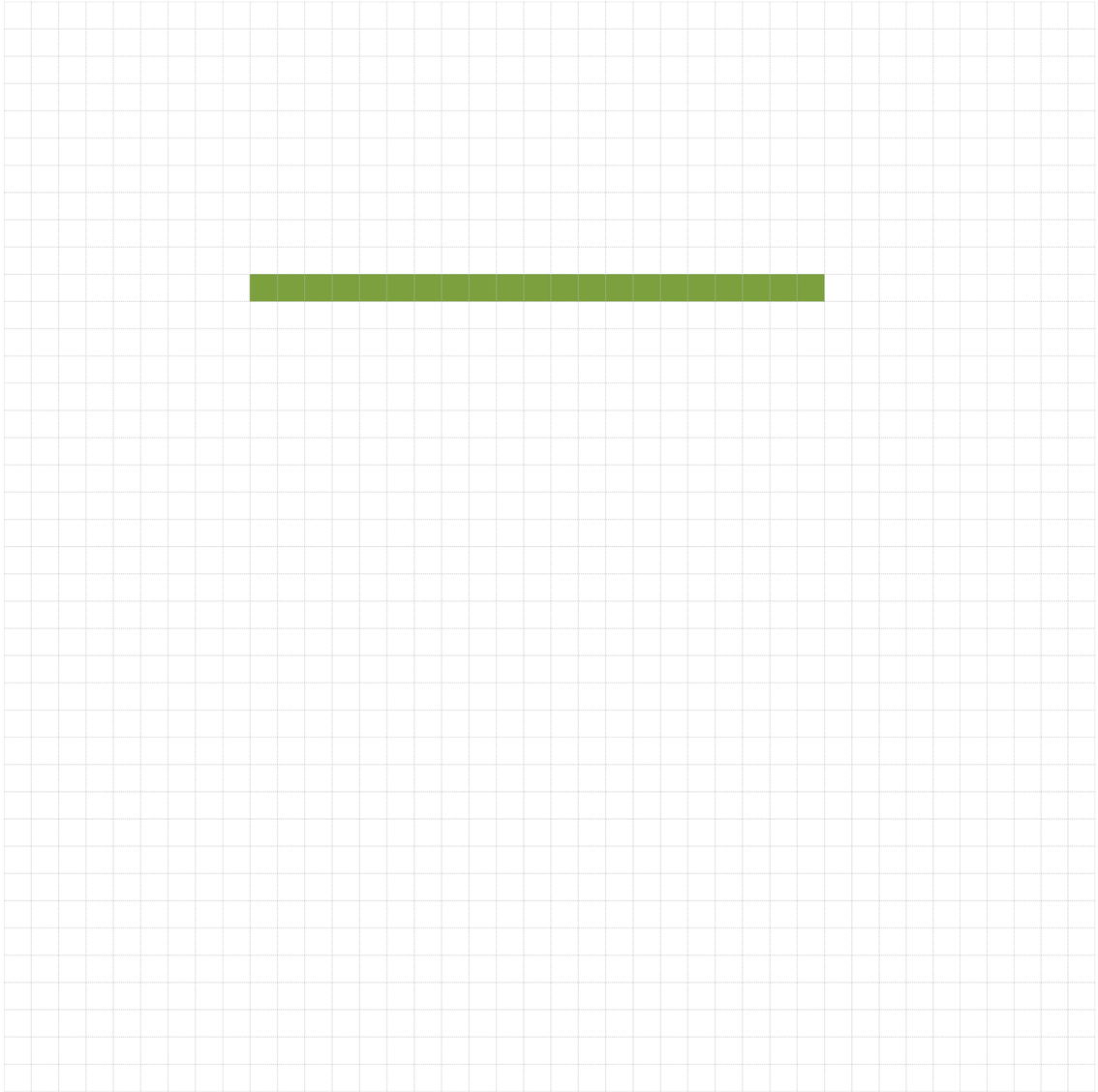
// call it
drawLine()
```



```
drawPixel(10,10)


func drawLine(x1,y1,x2,y2)
   // calculate a line
   // ...

end func
```



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   // calculate a line
   // ...

end func
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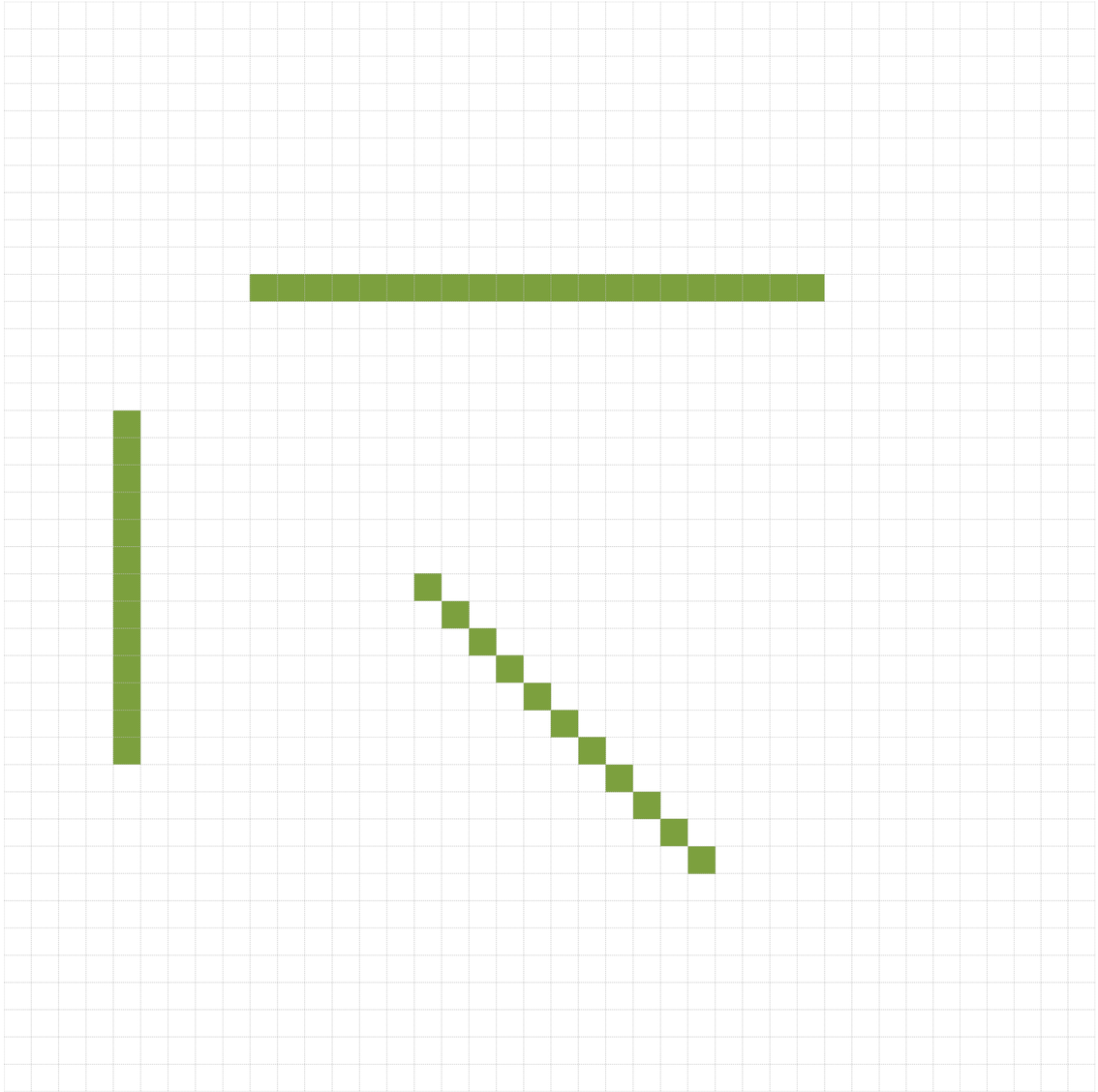

```
func drawSquare(x1,y2,size)
   // calculate two horizontal
   // and two vertical lines
   drawLine(...)
   drawLine(...)
   drawLine(...)
   drawLine(...)
end func
```

```
func drawCube(x1,y2,size)
  // calculate inner and
  // outer squares
  drawSquare(...)
  drawSquare(...)
  drawLine(...)
  drawLine(...)
  drawLine(...)
  drawLine(...)
end func
```

```
func drawSpinningCube(...)
   // a little more
   // calculation...
   for i in someValue
      drawCube(...)
   end for
end func
```

```
drawSpinningCube()
```

```
drawSpinningCube()

// calls drawCube
    // calls drawSquare
        // calls drawLine
            // calls drawPixel
```

Generic Functionality

Generic Functionality

Date and Time Functions

Generic Functionality

Date and Time Functions

Sorting Functions

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Date and Time Functions

Sorting Functions

Searching Functions

Generic Functionality

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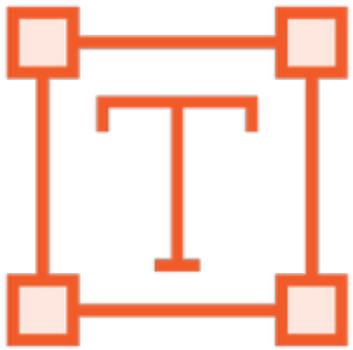
Sorting Functions

Searching Functions



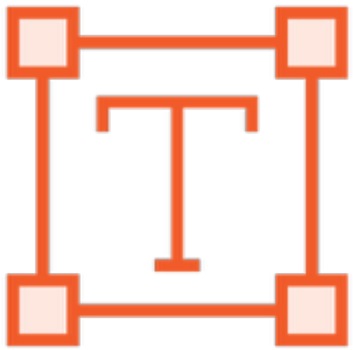
String Manipulation

Generic Functionality

Date and Time Functions

Sorting Functions

Searching Functions



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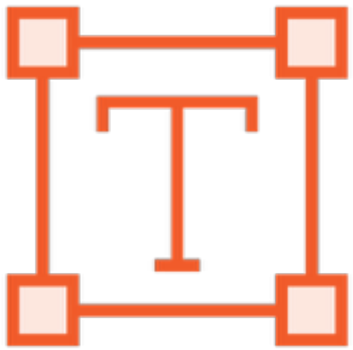
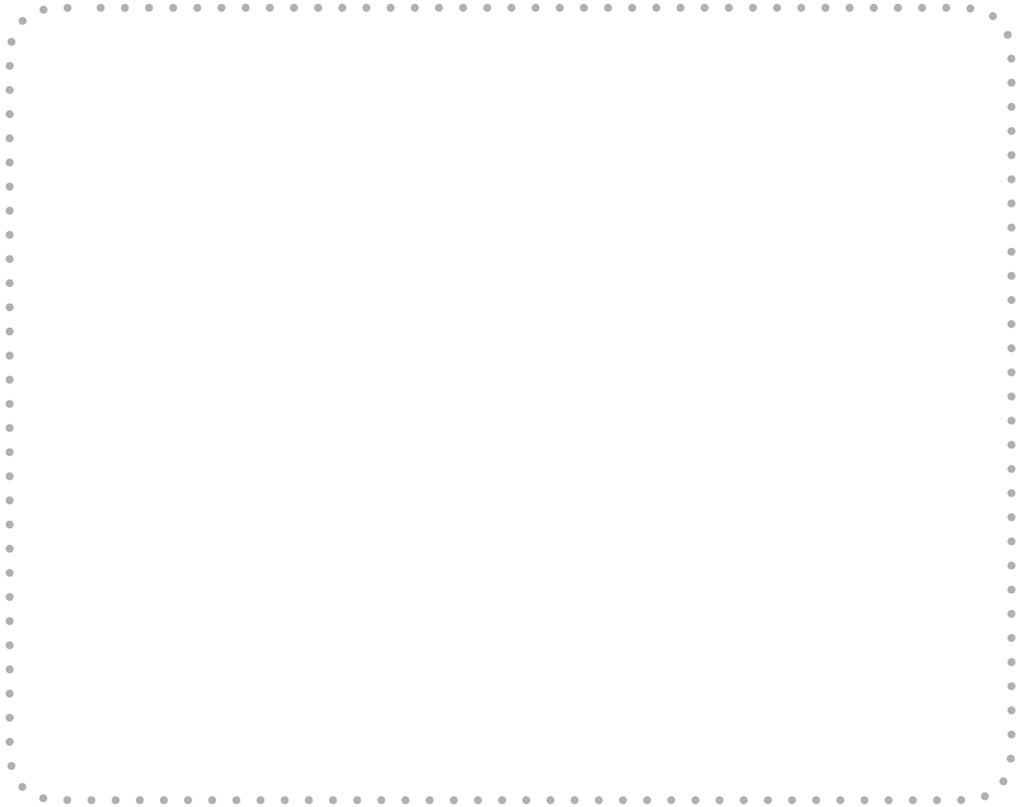


String Manipulation

Library

Types of Library

Types of Library



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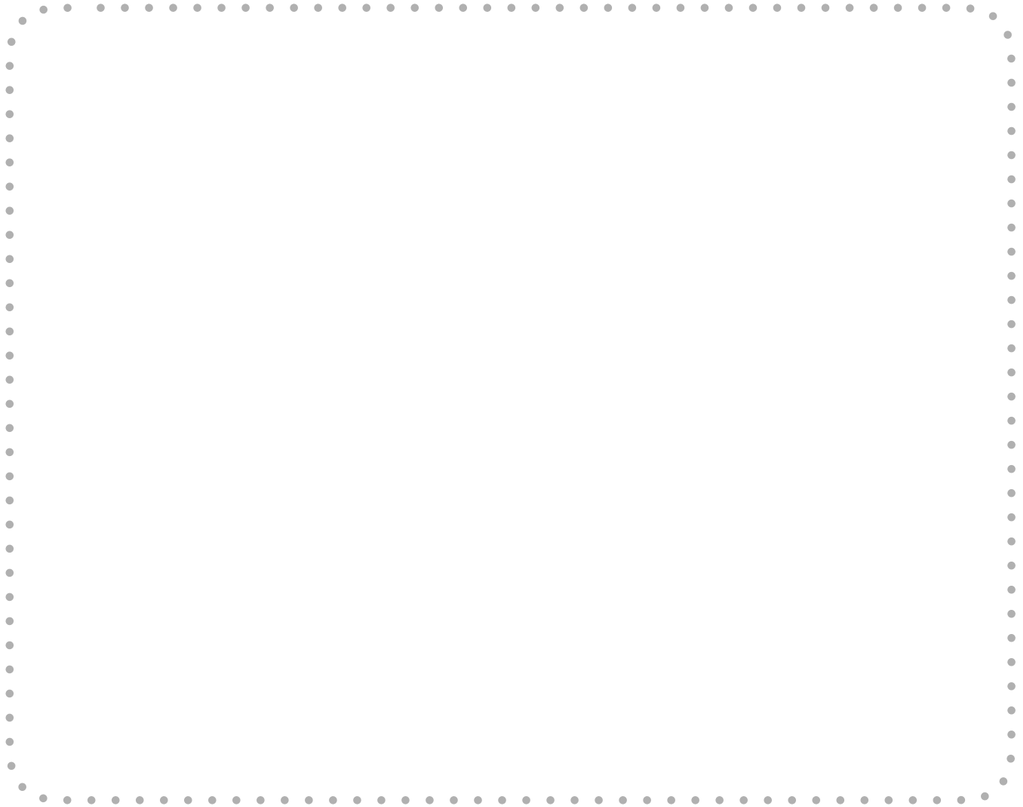

General

Types of Library

Date / Time functions

General

Types of Library

Date / Time functions

Math functions

General

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Date / Time functions

Math functions

File Input/Output

General

Types of Library

Date / Time functions

Math functions

File Input/Output

Error handling

General

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Multithreading

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File Input/Output

Error handling

Multithreading

Collections

General

Types of Library

Date / Time functions

Math functions

File Input/Output

Error handling

Multithreading

Collections

(etc.)

General

Types of Library

Date / Time functions

Math functions

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Collections

(etc.)

General

Audio library

2D Graphics library

3D Graphics library

Web / HTML library

Encryption library

and many others.

Specialized

Types of Library

Date / Time functions

Math functions

File Input/Output

Error handling

Multithreading

Collections

(etc.)

General

AKA "Standard Library"

Audio library

2D Graphics library

3D Graphics library

Web / HTML library

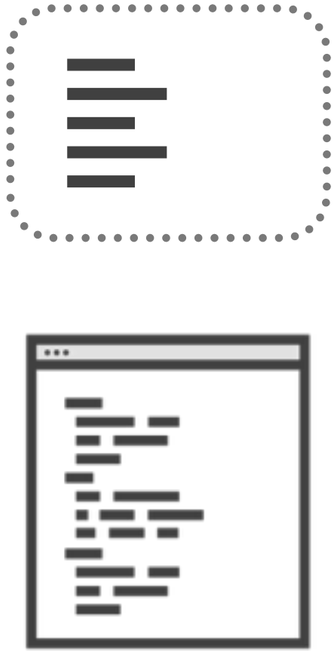
Encryption library

and many others.

Specialized

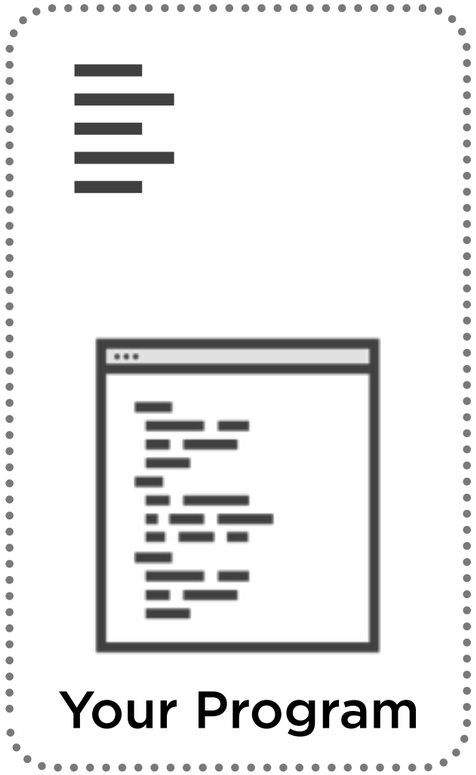
Libraries vs. Frameworks

Library



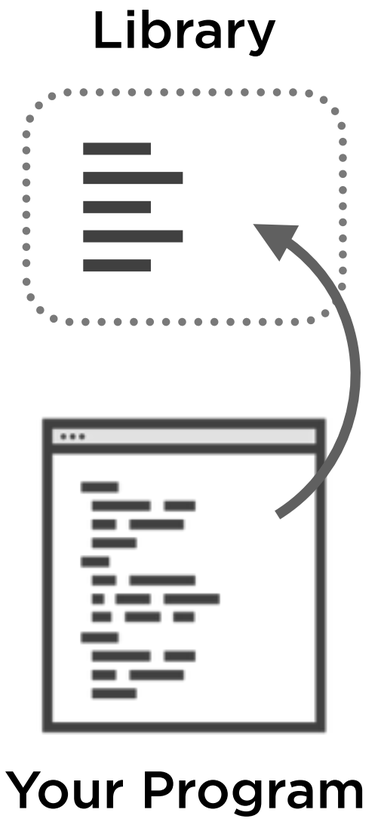
Your Program

Framework

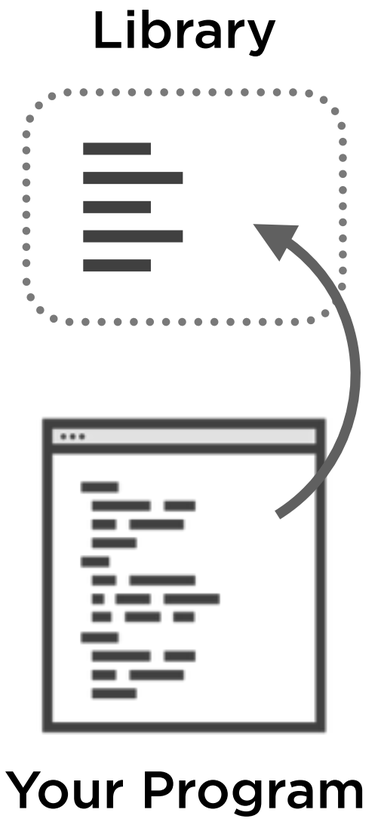


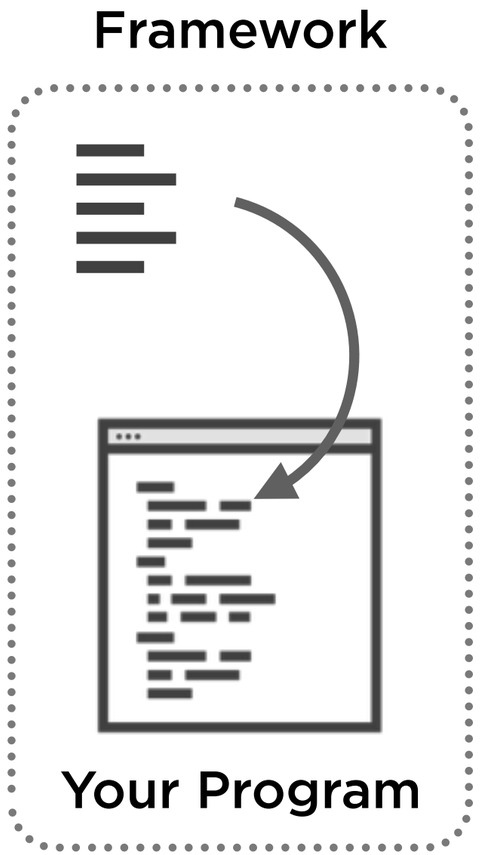
Your Program

Libraries vs. Frameworks



Libraries vs. Frameworks





What is an SDK?

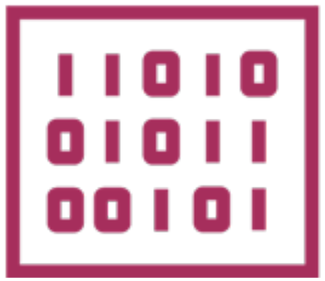
Software Development Kit (SDK)

Programming Tools

Reference Manuals

Tutorials

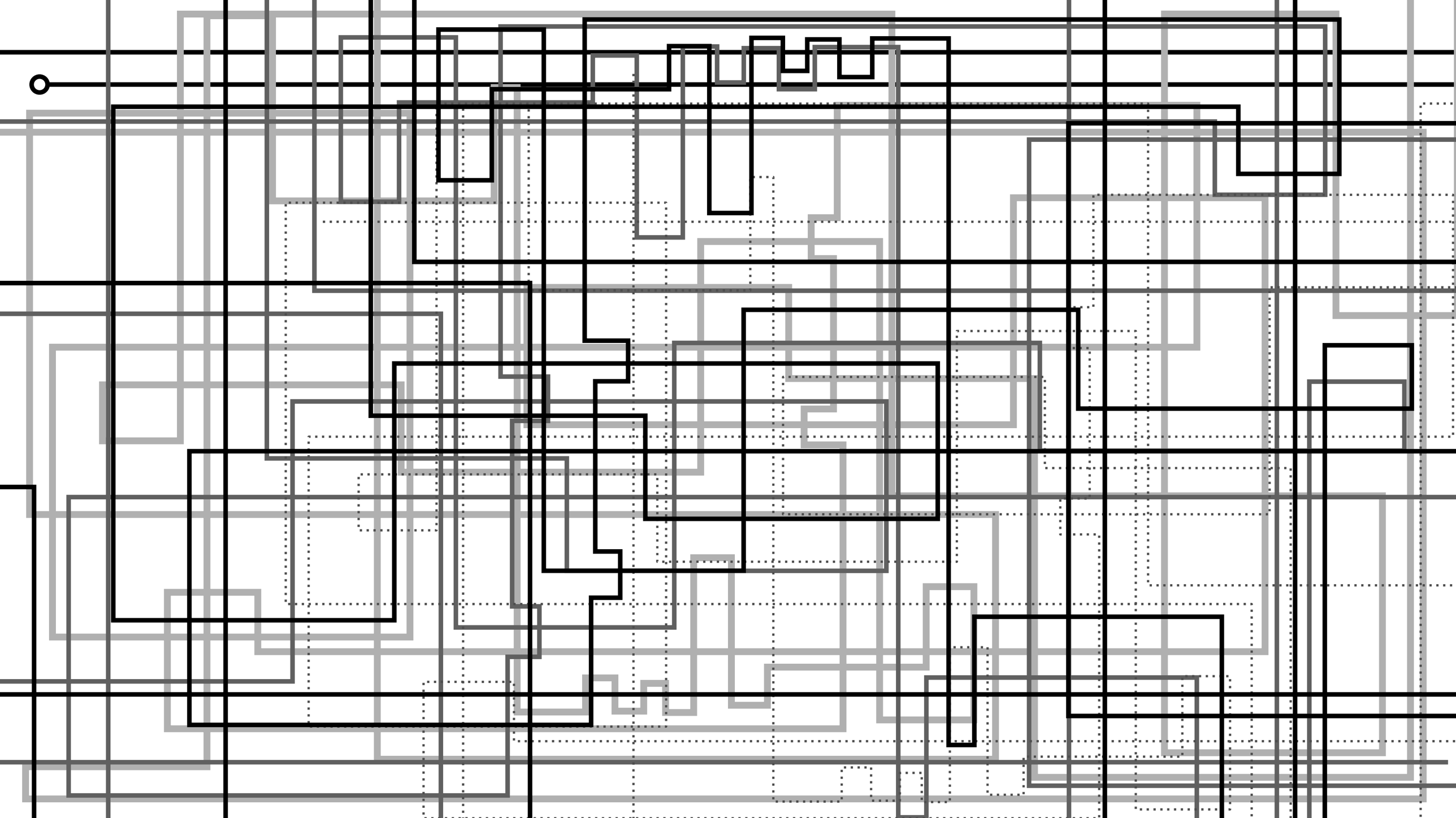
Sample Code



Libraries / Frameworks

Emulators

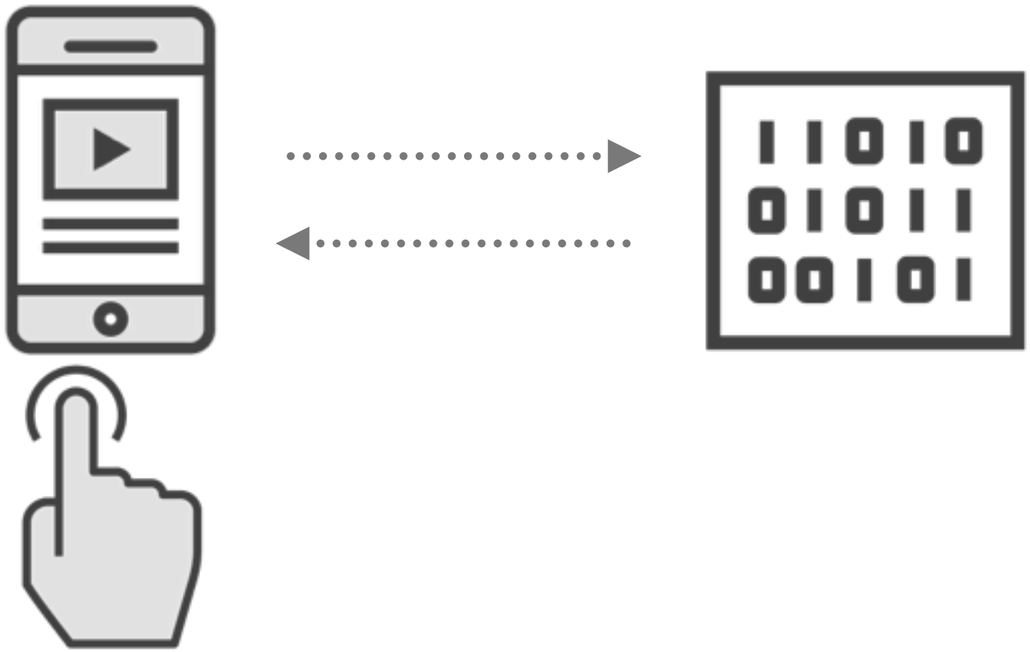
What is an API?



Interface

Interface

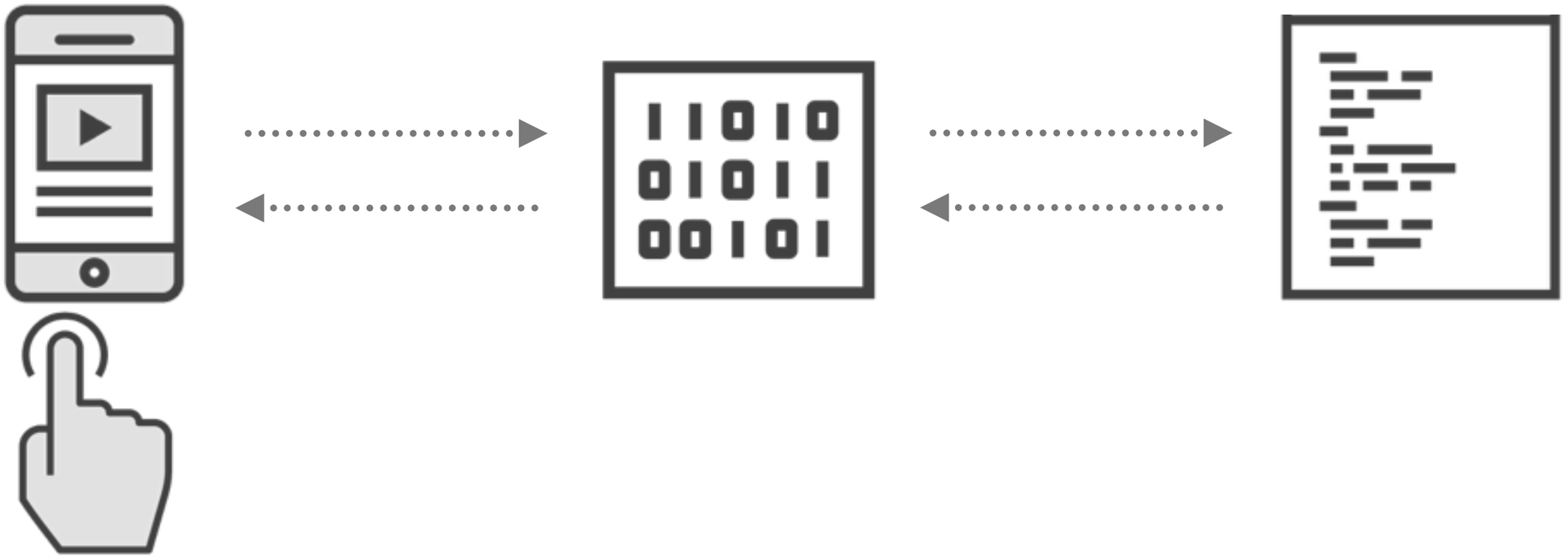
User Interface (UI)



Interface

User Interface (UI)

Application Programming Interface (API)



Using an API (Pseudocode)

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// TODO: compress image? how?
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import someCompressionLibrary

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var myCompressor = new Compressor()
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myCompressor.setOutputName("output.zip")
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myCompressor.zip()
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if result > 0 {
   // something went wrong...
}
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}
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Choosing a Programming Language

Make The Most of What You Have

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Java, Oracle?

C# / .NET, SQL Server?

Ruby on Rails?

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Software Development Areas

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Game Development

Unity (C#),
Unreal Engine (C++)

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Python, R

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Python, R

Specialized Areas

My Suggestions

Python

Swift

JavaScript

My Suggestions

Python

Swift

JavaScript

My Suggestions

Python

Swift

JavaScript

My Suggestions

Python

Swift

JavaScript