

웹 표준에 맞는 HTML5 프로그래밍 강의 노트

제 28회차
HTML5+CSS3+jQuery 간단한 게임 개발

■ 학습목표

- HTML5와 CSS3, jQuery를 이용해 만든 게임이 어떤 것들이 있는지 설명할 수 있다.
- HTML5와 CSS3, jQuery를 이용해 간단한 게임을 직접 만들 수 있다.

■ 학습내용

- HTML5+CSS3+jQuery로 만든 게임
- 테트리스 게임 개발

1. HTML5+CSS3+jQuery로 만든 게임

1) 앵그리버드 : HTML5 + CSS3 + jQuery



- 소스 분석

```
<!DOCTYPE html>
<html>
  <head>
    <base href="http://r241-dot-latest-dot-project-slingshot-hr.appspot.com" />
    <title>Angry Birds Chrome</title>
    <meta name="Title" content="Angry Birds Chrome">
    <meta name="description" content="Play Angry Birds online in HD with Google Chrome">
    <meta name="keywords" content="angry birds, free angry birds, online game, play online, angry birds app, chrome, google chrome, web browser, HD, arcade game, online, play angry birds online, web, application, game, iphone, android, ipad, slingshot, catapult, explosions, golden egg, levels, pigs, birds, stars, high scores, chrome os, chrome web store, angry birds rovio, play angry birds on computer, apps for chrome, play angry birds free">
    <link href='http://fonts.googleapis.com/css?family=Terminal+Dosis:800' rel='stylesheet' type='text/css'>
    <link rel="stylesheet" href="css/angry_birds_chrome.css" type="text/css">
    <link rel="chrome-webstore-item" href="https://chrome.google.com/webstore/detail/aknpkdfaaafgjchaibgeefbgmgeghloj">
    <script type="text/javascript">
      var _gaq = _gaq || [];
      _gaq.push(['_setAccount', 'UA-23082676-1']);
      _gaq.push(['_trackPageview']);
```

1. HTML5+CSS3+jQuery로 만든 게임

1) 앵그리버드 : HTML5 + CSS3 + jQuery

```
(function() {
    var ga = document.createElement('script'); ga.type = 'text/javascript'; ga.async = true;
    ga.src = ('https:' == document.location.protocol ? 'https://ssl' : 'http://www') +
    '.google-analytics.com/ga.js';
    var s = document.getElementsByTagName('script')[0];
    s.parentNode.insertBefore(ga, s);
})();
</script>

<script>
    function externalLink(type) {
        _gaq.push(['_trackEvent', 'Promo', 'Promotional Link: ' + type]);
    }
</script>

<script type="text/javascript" src="fowl/fowl.nocache.js"></script>

<script type="text/javascript" src="http://www.google.com/jsapi"></script>
<script type="text/javascript">
    google.load('payments', '1.0', {
        'packages': [

            'production_config'

        ]
    });
</script>
</head>
<body>
    <script type="text/javascript">
        function getFlashVersion() {
            try {
                var version;
                try {
                    version = new
ActiveXObject("ShockwaveFlash.ShockwaveFlash").GetVariable("$version");
                } catch (e) {
                    version = navigator.plugins["Shockwave Flash"].description;
                }
                return version.replace(/WD*(Wd+).*/g, "$1");
            } catch (e) {
                return -1;
            }
        }
    </script>
</body>
```

1. HTML5+CSS3+jQuery로 만든 게임

1) 앵그리버드 : HTML5 + CSS3 + jQuery

```

function haveAudioSupport() {

    try {
        if (new AudioContext()) {
            return true;
        }
    } catch (ignore) {}

    try {
        if (new webkitAudioContext()) {
            return true;
        }
    } catch (ignore) {}

    return getFlashVersion() >= 9.0;
}
</script>

<script type="text/javascript">
if (!haveAudioSupport()) {
    url = window.location.href;

    base = url.match(/^[^?#]*/);
    query = url.match(/W?[^#]*/) || "";
    hash = url.match(/#.*/);

    query = query.toString().replace(/[?&]$/, "");
    query = query ? query + "&" : "?";
    query += "show=need_flash";

    url = base + query;
    if (hash) url += hash;

    window.location.href = url;
}
</script>

<center>

<table class="content-table">
<tr>
<td>
<iframe id="left-banner" class="ads" src="left_banner.html" width="120px"
height="600px" frameborder=0
seamless="true" scrolling="no">
</iframe>
</td>

```

1. HTML5+CSS3+jQuery로 만든 게임

1) 앵그리버드 : HTML5 + CSS3 + jQuery

```

<td>

    <div class="gamecont" id="content">
        <div id='loginInfo'></div>

        <div id='gameDiv' style="display: inline-block;">
            <div id='playn-root'>
                <div id="loading">
                    
                </div>
            </div>
            <div id="rovionews"></div>
            <div id="videochapter"></div>
            <div id="ingameframecontainer"></div>
            <div id="cornerframecontainer1"></div>
        </div>
        <div class='buttons'>
            <div class='buttoncontainer'>

                <div id='version-buttons'></div>

                <script type="text/javascript">
                    installSuccess = function() {
                        document.getElementById("installButton").id = "offlineInstalled";
                        _gaq.push(['_trackEvent', 'InstalledApp', 'New install']);
                    }
                    installFail = function(message) {
                        console.log("Failed inline install: " + message);
                    }
                    attemptInstall = function() {
                        if (typeof chrome != 'undefined') {
                            chrome.webstore.install('https://chrome.google.com/webstore/detail/aknpkdffaafgjchaibgeefbgmgeghloj', installSuccess, installFail);
                        } else {
                            window.location.replace("https://chrome.google.com/webstore/detail/aknpkdffaafgjchaibgeefbgmgeghloj?utm_medium=et&utm_source=partner-angrybirds-bottom-link-1");
                        }
                    }
                </script>
                <a id='installButton'
                    href='https://chrome.google.com/webstore/detail/aknpkdffaafgjchaibgeefbgmgeghloj'
                    onclick="attemptInstall(); return false;" onmouseover="tooltip.innerHTML = 'Installing the game allows offline play. Crush pigs wherever you are!'"
                    onmouseout="resetTooltip();"></a>
            </div>
        </div>
    </div>

```

1. HTML5+CSS3+jQuery로 만든 게임

1) 앵그리버드 : HTML5 + CSS3 + jQuery

```

        <a href="#" class="loginButton" id="login"></a>
        <a href="http://www.rovio.com/en/support/faq&support_category_id=36"
id="faqButton" onmouseover="tooltip.innerHTML = 'Frequently Asked Questions'"
onmouseout="resetTooltip();" onclick="externalLink('FAQ');
window.open('http://www.rovio.com/en/support/faq&support_category_id=36',
'_blank'); return false;"></a>

    </div>

    <div id='social-container'>
        <a id="twitterButton" href="https://twitter.com/share" class="twitter-share-
button">Tweet</a><script>!function(d,s,id){var
js,fjs=d.getElementsByTagName(s)[0];if(!d.getElementById(id)){js=d.createElement(s);js
.id=id;js.src="//platform.twitter.com/widgets.js";fjs.parentNode.insertBefore(js,fjs);}(do
cument,"script", "twitter-wjs");</script>
        <iframe id="fb-like-iframe"
src="http://www.facebook.com/plugins/like.php?app_id=167680559959348&href=htt
p%3A%2F%2Fwww.facebook.com%2Fangrybirds&send=false&layout=button_count
&ref=chrome.angrybirds.com&width=100&show_faces=false&action=like&colorschem
e=dark&font&height=25"
        scrolling="no" frameborder="0" style="visibility: hidden; border:none;
overflow:hidden; width:160px; height:25px;" allowTransparency="true"></iframe>
        <a href="https://www.google.com/chrome" id="optimized"
onclick="externalLink('Optimized for Chrome');
window.open('https://www.google.com/chrome', '_blank'); return false;"></a>
    </div>

    <div id='tooltip'></div>
    <script type="text/javascript">
        tooltip = document.getElementById('tooltip');
        resetTooltip = function() { tooltip.innerHTML = ""; }
    </script>
</div>
</div>

</td>
<td id="rightBannerContainer">
</td>
</tr>
</table>

```

1. HTML5+CSS3+jQuery로 만든 게임

1) 앵그리버드 : HTML5 + CSS3 + jQuery

```

</center>

<iframe id='appcacheInstaller' style="display: none;"></iframe>
<script type="text/javascript">
    var addlframe = false;
    if (window.chrome && window.chrome.app && window.chrome.app.isInstalled) {
        addlframe = true;
    } else {
        if (window.applicationCache && window.applicationCache.status ==
window.applicationCache.IDLE) {

            var date = new Date();
            date.setTime(date.getTime() + 60 * 1000);
            document.cookie = "uninstall=1; expires=" + date.toGMTString() + ";
path=/manifest";
            addlframe = true;
        }
    }
    if (addlframe) {
        document.getElementById('appcacheInstaller').src =
'http://chrome.angrybirds.com/AppCacheInstaller.html';
    }
</script>

<noscript>
<div class="info-noscript">
    Your web browser must have JavaScript enabled
    in order for this application to display correctly.
</div>
</noscript>

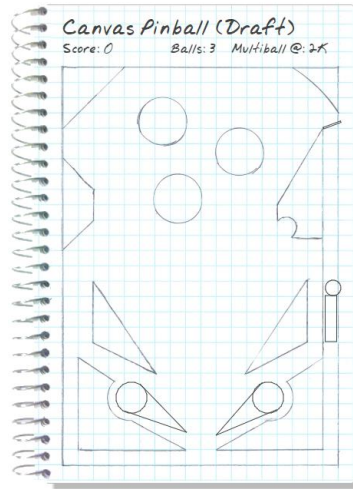
<script type="text/javascript">
    if (window.self != window.top && window.top.location.host.match("[a-zA-
Z]*W.angrybirdsW.com") == null) {
        setInterval(function() {
            var content = document.getElementById('content');
            content.parentNode.style.display = 'none';
            var playn = document.getElementById('playn-root');
            if (playn != null) playn.parentNode.removeChild(playn);
        }, 500);
    }
</script>

</body>
</html>

```


1. HTML5+CSS3+jQuery로 만든 게임

2) 캔버스 핀볼



- 소스 분석

```
<!DOCTYPE html>
<html id="demohtml" xmlns="http://www.w3.org/1999/xhtml" class="testdrive">
<head>
  <!-- Copyright © Microsoft Corporation. All Rights Reserved. -->
  <title>Canvas Pinball</title>
  <meta http-equiv="X-UA-Compatible" content="IE=edge" />
  <link rel="stylesheet" type="text/css" href="../../Includes/Styles/OldTestDrive.css" />
  <link rel="stylesheet" type="text/css"
href="../../Includes/Styles/OldTestDriveFullWindow.css" />
  <link rel="stylesheet" type="text/css"
href="../../Includes/Styles/ReturnAndShareControls.css" />
  <link rel="shortcut icon" href="../../Includes/Image/Favicon.ico" />
  <style id="inlinecss" title="democss" type="text/css">
    /*<![CDATA[*]
    @font-face
    {
      font-family: 'jr!handRegular';
      src: url('assets/jrha____-webfont.woff') format('woff');
    }

    html#demohtml
    {
      background-color: white;
      overflow: hidden;
    }
  </style>
</html>
```

1. HTML5+CSS3+jQuery로 만든 게임

2) 캔버스 핀볼

```
#demoContentWrapper
{
  overflow: hidden;
}

body
{
  overflow: hidden;
}

#legallinks, #copyright, input#thisUrl
{
  color: black;
}

#_debugWindow
{
  position: absolute;
  top: 0;
  right: 0;
  opacity: .8;
  overflow: auto;
  height: 200px;
  width: 500px;
  background-color: #b0c4de;
  font-family: Courier New;
  font-size: small;
  padding: 20px;
  border-radius: 10px;
  border: 2px solid #000;
  display: none;
}

#containerDiv
{
  position: relative;
  margin: 0 auto;
  min-width: 900px;
  max-width: 1400px;
}
```

1. HTML5+CSS3+jQuery로 만든 게임

2) 캔버스 핀볼

```
#GameContainer
{
    position: absolute;
    padding: 0px;
    top: 80px;
    left: 107px;
    border-right-color: #BBBBBB;
    border-right-style: solid;
    border-right-width: 1px;
    border-bottom-color: #BBBBBB;
    border-bottom-style: solid;
    border-bottom-width: 1px;
    border-bottom-right-radius: 5px;
    box-shadow: 8px 8px 4px #BBB;
    z-index: 2;
}
#Header
{
    position: absolute;
    padding: 0px;
    top: 20px;
    left: 107px;
    border-top-color: #BBBBBB;
    border-top-style: solid;
    border-top-width: 1px;
    border-top-right-radius: 5px;
    border-right-color: #BBBBBB;
    border-right-style: solid;
    border-right-width: 1px;
    box-shadow: 8px 8px 4px #BBB;
    z-index: 1;
}
#Spirals
{
    position: absolute;
    padding: 0px;
    top: 21px;
    left: 50px;
    z-index: 10;
}
```

1. HTML5+CSS3+jQuery로 만든 게임

2) 캔버스 핀볼

```
#blather
{
    position: absolute;
    top: 30px;
    left: 580px;
    right: 30px;
}
.Title
{
    position: absolute;
    top: 30px;
    left: 127px;
    z-index: 10;
    font-weight: normal;
    font-style: normal;
    line-height: normal;
    color: #444444;
    font-family: 'jr!handRegular' , sans-serif;
    font-size: 32px;
    width: 580px;
}
.Score
{
    position: absolute;
    z-index: 10;
    font-weight: normal;
    font-style: normal;
    line-height: normal;
    color: #444444;
    font-family: 'jr!handRegular' , sans-serif;
    font-size: 20px;
    width: 580px;
}

.DescTitle
{
    margin: 0;
    padding: 0;
    padding-bottom: 5px;
    line-height: 1em;
    font-size: 2.3em;
    font-weight: normal;
    font-family: 'Segoe UI Light' , 'Segoe UI' , Arial, Helvetica, Sans-Serif;
    color: #09c;
}
```

1. HTML5+CSS3+jQuery로 만든 게임

2) 캔버스 핀볼

```

p
{
    margin: 5px 0;
}

.GiantFont
{
    font-size: 225%;
    position: relative;
    top: 5px;
    padding-bottom: 5px;
}

#arrowKeys
{
    top: 15px;
    position: relative;
}

/*]]>*/
</style>
<meta name="t_omni_demopage" content="1" />
</head>

<body id="demobody">
    <div id="fullbodywrap">
        <div id="ReturnAndShareControls"></div>
        <table id="headertable" border="0" cellpadding="0" cellspacing="0"
width="100%">
            <tr>
                <td class="heading">
                    <h1 id="demobodyh1">Canvas Pinball</h1>
                </td>
            </tr>
        </table>
        <div id="demoContentCenterer">
            <div id="demoContentWrapper">
                <div id="_debugWindow">
                </div>
                <div id="containerDiv">
                    <div class="Title">
                        Canvas Pinball (Draft)
                    </div>
                    <div class="Score" style="top: 65px; left: 127px">
                        Score: <span id="spScore"></span>
                    </div>
                </div>
            </div>
        </div>
    </div>
</body>

```

1. HTML5+CSS3+jQuery로 만든 게임

2) 캔버스 핀볼

```

<div class="Score" style="top: 65px; left: 267px">
  Balls: <span id="spBalls"></span>
</div>
<div class="Score" style="top: 65px; left: 347px">
  Multiball&nbsp;@: <span id="spMultiball"></span>K</div>
<div class="Title" id="dGameOver" style="top: 370px; left: 200px">
</div>
<div>
  </img></div>
<div>
  </img></div>
<div id="GameContainer">
  <canvas id="pinballCanvas" height="560" width="400"></canvas>
</div>
<div id="blather">
  <h1 class="DescTitle">Canvas Pinball</h1>
  <p>
    This demo is a simple pinball game that uses several HTML5
    technologies along with the Box2D physics engine. It uses HTML5 Canvas element for
    drawing, and @font-face and WOFF for font embedding. </p>
    <p>
      To play, use the arrow keys <span class="GiantFont"><span
id="arrowKeys"></span></span>. Left and right operate the flippers, and
the down arrow key operates the launcher.</p>

    <p id="touchHelp" style="display: none">On a touch enabled device,
    you can touch the flippers and launcher to play the game</p>

  </div>
</div>
</div>
</div>
</div>
</div>

```

1. HTML5+CSS3+jQuery로 만든 게임

2) 캔버스 핀볼

```
<script type="text/javascript" src="assets/box2d2/box2d.js"></script>
<script type="text/javascript" src="Keyboard.js"></script>
    <script type="text/javascript" src="assets/board.js"></script>
<script type="text/javascript" src="assets/util.js"></script>
<script type="text/javascript" src="assets/debugLog.js"></script>
<script type="text/javascript" src="assets/scoreboard.js"></script>
<script type="text/javascript" src="assets/animationManager.js"></script>
<script type="text/javascript" src="demo.js"></script>
<script type="text/javascript"
src="../../Includes/Script/FeatureDetectCanvas.js"></script>
<script type="text/javascript"
src="../../includes/script/TestDriveCommon.js"></script>
<script type="text/javascript"
src="../../Includes/Script/ReturnAndShareControls.js"></script>
</body>
</html>
```

1. HTML5+CSS3+jQuery로 만든 게임

3) Pirates Love Daisies



- 소스 분석

```
<!DOCTYPE html>
<html>
<head>
  <meta charset="UTF-8" />

  <title>Pirates Love Daisies: An HTML5 Tower Defence Strategy
  Game</title>

  <!-- Facebook MetaData -->

  <meta property="og:title" content="Pirates Love Daisies: An HTML5 Tower Defence
  Strategy Game" />

  <meta property="og:description" content="Pirates Love Daisies, the fun new Tower
  Defense game built with HTML5!" />

  <!-- End Facebook -->

  <link rel="shortcut icon" type="image/x-icon" href="favicon.ico">

  <link href="css/main.css" rel="stylesheet" />

  <link href="css/trace.css" rel="stylesheet" />

  <script src="scripts/compiled-scripts.js"></script>

</head>
```


1. HTML5+CSS3+jQuery로 만든 게임

3) Pirates Love Daisies

```

<body>
  <div id="piratesLoveDaisies">
    <canvas id="fallingDaisies1" width="980" height="700" style="position: absolute;
top: 0px; "></canvas>

    <div id="preloader">
      <canvas id="preloaderBar" width="240" height="36"></canvas>
      
    </div>
    <canvas id="fallingDaisies2" width="980" height="700" style="position: absolute;
top: 0px; "></canvas>

    <!-- UI screens are loaded into this div dynamically: -->

    <div id="screens"></div>
    <div id="game" class="uiScreen">

      <!-- Game UI -->

      <div id="topNav">

        <label id="daisyLabel" class="daisy">99</label>
        <label id="moneyLabel" class="money">0</label>
        <label id="pointsLabel" class="score">0</label>

      </div>

      <div id="muteBtn" class="smallUIButton" onClick="toggleMute()">Mute</div>
      <div id="togglePauseBtn" class="smallUIButton"
onClick="togglePause()">Pause</div>
      <div id="quitBtn" class="smallUIButton"
onClick="handleGameQuit()">Quit</div>

      <div id="bottomNav">

        <div class="menuButton hireButton"></div>
        <div class="menuButton hireButton"></div>
        <div class="menuButton hireButton"></div>
        <div class="menuButton hireButton"></div>
        <div class="menuButton hireButton"></div>

        <div id="upgradeButton" class="menuButton editButton"></div>

        <div id="retireButton" class="menuButton editButton"></div>

```

1. HTML5+CSS3+jQuery로 만든 게임

3) Pirates Love Daisies

```

    <div id="nextWaveIndicator">
      <canvas width="100" height="30"></canvas>
      <div id="nextWaveButton"></div>
      <label class="nextWaveLabel"></label>
    </div>

  </div>

  <!-- Game play area -->
  <img id="backgroundImage" width="980" height="700" />
  <div class="tileCanvas">
    <canvas id="tileCanvas" width="980" height="700"></canvas>

  </div>

  <div id="uiOveray" class="uiCanvas">
    <canvas id="uiCanvas" width="980" height="700"></canvas>

  </div>

  <div id="gameCanvasDiv" class="animationCanvas">
    <canvas id="gameCanvas" width="980" height="700"></canvas>
  </div>

  <div id="effectsDev" class="animationCanvas">
    <canvas id="effectsCanvas" width="980" height="700"></canvas>
  </div>

  <div id="gameOverlay"></div>
</div>

<div id="content">

  <div id="credits">

    Concept, development, and creative direction by <a href="http://gskinner.com/"
    target="_blank">gskinner.com</a>.

    Illustration by <a href="http://pulpstudios.ca/" target="_blank">Pulp Studios</a>.

    Sound by <a href="mailto:washington@gmail.com">Washington, Inc</a>.

    Hosted on <a href="http://www.microsoft.com/windowsazure/scenarios/social-
    games/" target="_blank">Windows Azure</a>

```

1. HTML5+CSS3+jQuery로 만든 게임

3) Pirates Love Daisies

```

<!-- ! -->

</div>

<div id="effectsToggle">

<div style="position:absolute; top:2px; z-index:2;">

<input type="checkbox" id="effects" onClick="toggleEffects()" />

<label for="effects">Enable additional effects for IE9 (<a href="#"
id="effectsToggleLink">What is this?</a></label>

</div>

<div id="shareBar" style="position:absolute; right:0; top:2px; text-align:right;">

<b>Share:</b> &nbsp;

<a
href="http://www.facebook.com/sharer.php?u=pirateslovedaisies.com&t=Pirates Love
Daisies" target="_blank"></a> &nbsp;

<a href="http://twitter.com/share?text=Check out Pirates Love Daisies, the fun
new Tower Defense game built with
HTML5! %23PLD&url=http://pirateslovedaisies.com" target="_blank"></a> &nbsp;

<a
href="http://profile.live.com/badge/?url=http://pirateslovedaisies.com&title=Pirates
Love Daisies&description=Check out Pirates Love Daisies, the fun new Tower Defense
game built with HTML5!" target="_blank"></a> &nbsp;

<a
href="http://www.stumbleupon.com/submit?url=http://pirateslovedaisies.com&title=C
heck out Pirates Love Daisies, the fun new Tower Defense game built with HTML5!"
target="_blank"></a> &nbsp;

<a
href="http://www.digg.com/submit?url=http://pirateslovedaisies.com&title=Check out
Pirates Love Daisies, the fun new Tower Defense game built with HTML5!"
target="_blank"></a>
&nbsp;

```

1. HTML5+CSS3+jQuery로 만든 게임

3) Pirates Love Daisies

```

    <a
href="http://www.delicious.com/submit?url=http://pirateslovedaisies.com&title=Check
out Pirates Love Daisies, the fun new Tower Defense game built with HTML5!"
target="_blank"></a> &nbsp;

    <a
href="http://www.reddit.com/submit?url=http://pirateslovedaisies.com&title=Check
out Pirates Love Daisies, the fun new Tower Defense game built with HTML5!"
target="_blank"></a>

    </div>

    <div style="position:absolute; left:460px; top:2px;">

    <iframe
src="http://www.facebook.com/plugins/like.php?href=http%3A%2F%2Fpiratesloveda
isies.com%2F&layout=button_count&show_faces=true&width=90&am
p;action=like&colorscheme=light&height=21" scrolling="no"
frameborder="0" style="border:none; overflow:hidden; width:90px; height:21px;"
allowTransparency="true"></iframe>

    </div>

    </div>

    </div>

    <div id="unsupportedBrowser">
    <p><strong>Your browser appears to be unsupported!</strong></p>
    <p>Pirates &hearts; Daisies is a tower defense game, developed using JavaScript
and HTML5 features, many of which are not supported by older browsers.</p>
    <p>Current supported browsers are:</p>
    <ul>

    <li><a href="http://windows.microsoft.com/ie9">Internet Explorer 9</a>
(Recommended)</li>
    <li><a href="http://www.apple.com/safari/download/">Safari 5</a></li>
    <li><a href="http://www.google.com/chrome">Chrome 6 or higher</a></li>
    <li><a href="http://www.opera.com/">Opera 10 or higher</a></li>
    <li><a href="http://www.mozilla.com/en-US/firefox/personal.html">Firefox
3.6</a></li>
    </ul>

```

1. HTML5+CSS3+jQuery로 만든 게임

3) Pirates Love Daisies

```
<br />

</div>

<div id="fontPreload" style="font-family: freeBooterFont; visibility: hidden">.</div>

<!-- Start of StatCounter Code -->

<script type="text/javascript">

    var sc_project = 6480135;

    var sc_invisible = 1;

    var sc_security = "32b11e7b";

</script>

<script type="text/javascript"
src="http://www.statcounter.com/counter/counter.js"></script>

<noscript><div class="statcounter"><a title="tumblr visitor"
href="http://statcounter.com/tumblr/" target="_blank">

    </a></div></noscript>

<!-- End of StatCounter Code -->

</body>

</html>
```

2. 테트리스 게임 개발

1) 테트리스 게임의 구성 파일

- style.css 파일

```
canvas {  
  display: block;  
  margin: auto;  
  border: 1px solid black;  
}
```

- 자바스크립트 파일

- 사용자 입력에 따른 블록의 움직임을 제어
- 테트리스 블록 움직임에 따른 블록의 모양을 지정
- 테트리스 게임의 전체적인 기능인 블록을 쌓고 지우는 기능을 담당

- controller.js

```
document.body.onkeydown = function( e ) {  
  var keys = {  
    37: 'left',  
    39: 'right',  
    40: 'down',  
    38: 'rotate'  
  };  
  if ( typeof keys[ e.keyCode ] != 'undefined' ) {  
    keyPress( keys[ e.keyCode ] );  
    render();  
  }  
};
```

2. 테트리스 게임 개발

1) 테트리스 게임의 구성 파일

- render.js 파일

```

var canvas = document.getElementsByTagName( 'canvas' )[ 0 ];
var ctx = canvas.getContext( '2d' );
var W = 300, H = 600;
var BLOCK_W = W / COLS, BLOCK_H = H / ROWS;

// draw a single square at (x, y)
function drawBlock( x, y ) {
    ctx.fillRect( BLOCK_W * x, BLOCK_H * y, BLOCK_W - 1, BLOCK_H - 1 );
    ctx.strokeRect( BLOCK_W * x, BLOCK_H * y, BLOCK_W - 1, BLOCK_H - 1 );
}
// draws the board and the moving shape
function render() {
    ctx.clearRect( 0, 0, W, H );

    ctx.strokeStyle = 'black';
    for ( var x = 0; x < COLS; ++x ) {
        for ( var y = 0; y < ROWS; ++y ) {
            if ( board[ y ][ x ] ) {
                ctx.fillStyle = colors[ board[ y ][ x ] - 1 ];
                drawBlock( x, y );
            }
        }
    }

    ctx.fillStyle = 'red';
    ctx.strokeStyle = 'black';
    for ( var y = 0; y < 4; ++y ) {
        for ( var x = 0; x < 4; ++x ) {
            if ( current[ y ][ x ] ) {
                ctx.fillStyle = colors[ current[ y ][ x ] - 1 ];
                drawBlock( currentX + x, currentY + y );
            }
        }
    }
}

setInterval( render, 30 );

```

2. 테트리스 게임 개발

1) 테트리스 게임의 구성 파일

- tetris.js 파일

```

var COLS = 10, ROWS = 20;
var board = [];
var lose;
var interval;
var current; // current moving shape
var currentX, currentY; // position of current shape
var shapes = [
  [ 1, 1, 1, 1 ],
  [ 1, 1, 1, 0, 1 ],
  [ 1, 1, 1, 0, 0, 0, 1 ],
  [ 1, 1, 0, 0, 1, 1 ],
  [ 1, 1, 0, 0, 0, 1, 1 ],
  [ 0, 1, 1, 0, 1, 1 ],
  [ 0, 1, 0, 0, 1, 1, 1 ]
];
var colors = [
  'cyan', 'orange', 'blue', 'yellow', 'red', 'green', 'purple'
];
// creates a new 4x4 shape in global variable 'current'
// 4x4 so as to cover the size when the shape is rotated
function newShape() {
  var id = Math.floor( Math.random() * shapes.length );
  var shape = shapes[ id ]; // maintain id for color filling

  current = [];
  for ( var y = 0; y < 4; ++y ) {
    current[ y ] = [];
    for ( var x = 0; x < 4; ++x ) {
      var i = 4 * y + x;
      if ( typeof shape[ i ] != 'undefined' && shape[ i ] ) {
        current[ y ][ x ] = id + 1;
      }
      else {
        current[ y ][ x ] = 0;
      }
    }
  }
  // position where the shape will evolve
  currentX = 5;
  currentY = 0;
}

```


2. 테트리스 게임 개발

1) 테트리스 게임의 구성 파일

- tetris.js 파일

```
// clears the board
function init() {
    for ( var y = 0; y < ROWS; ++y ) {
        board[ y ] = [];
        for ( var x = 0; x < COLS; ++x ) {
            board[ y ][ x ] = 0;
        }
    }
}

// keep the element moving down, creating new shapes and clearing lines
function tick() {
    if ( valid( 0, 1 ) ) {
        ++currentY;
    }
    // if the element settled
    else {
        freeze();
        clearLines();
        if (lose) {
            newGame();
            return false;
        }
        newShape();
    }
}

// stop shape at its position and fix it to board
function freeze() {
    for ( var y = 0; y < 4; ++y ) {
        for ( var x = 0; x < 4; ++x ) {
            if ( current[ y ][ x ] ) {
                board[ y + currentY ][ x + currentX ] = current[ y ][ x ];
            }
        }
    }
}

// returns rotates the rotated shape 'current' perpendicularly anticlockwise
function rotate( current ) {
    var newCurrent = [];
    for ( var y = 0; y < 4; ++y ) {
        newCurrent[ y ] = [];
        for ( var x = 0; x < 4; ++x ) {
            newCurrent[ y ][ x ] = current[ 3 - x ][ y ];
        }
    }
    return newCurrent;
}
```

2. 테트리스 게임 개발

1) 테트리스 게임의 구성 파일

- tetris.js 파일

```
// check if any lines are filled and clear them
function clearLines() {
  for ( var y = ROWS - 1; y >= 0; --y ) {
    var rowFilled = true;
    for ( var x = 0; x < COLS; ++x ) {
      if ( board[ y ][ x ] == 0 ) {
        rowFilled = false;
        break;
      }
    }
    if ( rowFilled ) {
      document.getElementById( 'clearsound' ).play();
      for ( var yy = y; yy > 0; --yy ) {
        for ( var x = 0; x < COLS; ++x ) {
          board[ yy ][ x ] = board[ yy - 1 ][ x ];
        }
      }
      ++y;
    }
  }
}

function keyPress( key ) {
  switch ( key ) {
    case 'left':
      if ( valid( -1 ) ) {
        --currentX;
      }
      break;
    case 'right':
      if ( valid( 1 ) ) {
        ++currentX;
      }
      break;
    case 'down':
      if ( valid( 0, 1 ) ) {
        ++currentY;
      }
      break;
    case 'rotate':
      var rotated = rotate( current );
      if ( valid( 0, 0, rotated ) ) {
        current = rotated;
      }
      break;
  }
}
```

2. 테트리스 게임 개발

1) 테트리스 게임의 구성 파일

- tetris.js 파일

```
// checks if the resulting position of current shape will be feasible
function valid( offsetX, offsetY, newCurrent ) {
    offsetX = offsetX || 0;
    offsetY = offsetY || 0;
    offsetX = currentX + offsetX;
    offsetY = currentY + offsetY;
    newCurrent = newCurrent || current;

    for ( var y = 0; y < 4; ++y ) {
        for ( var x = 0; x < 4; ++x ) {
            if ( newCurrent[ y ][ x ] ) {
                if ( typeof board[ y + offsetY ] == 'undefined'
                    || typeof board[ y + offsetY ][ x + offsetX ] == 'undefined'
                    || board[ y + offsetY ][ x + offsetX ]
                    || x + offsetX < 0
                    || y + offsetY >= ROWS
                    || x + offsetX >= COLS ) {
                    if (offsetY == 1) lose = true; // lose if the current shape at the top row
                }
                when checked
                return false;
            }
        }
    }
    return true;
}

function newGame() {
    clearInterval(interval);
    init();
    newShape();
    lose = false;
    interval = setInterval( tick, 250 );
}

newGame();
```

▣ 정리하기

1. HTML5+CSS3+Query로 만든 게임

- 앵그리버드
- 핀볼
- Pirates Love Daisies

2. 테트리스 게임 개발

- 테트리스 게임 만들기
- controller.js : 사용자 입력에 따른 블록의 움직임을 제어
- render.js : 테트리스 블록 움직임에 따른 블록의 모양을 지정
- tetris.js : 테트리스 게임의 전체적인 기능인 블록을 쌓고 지우는 기능을 담당