

## LAMPIRAN

### 1. Module.Js

```
var canvas,ctx; var mouseX,mouseY,mouseDown=0; var touchX,touchY;
var moduleID = '#####'; var ayat = 7; var text_assign = ";
var total_score = 0;

function create_newFile(moduleID,studentId,studentName,status)
{
    var score = g_encode(score);
    var string = generate_array(100);
    array = string.split(',');
    array[0]=moduleID;
        array[1]=studentId;
        array[2]=studentName;
        array[3]=status;
    var Text = array_toText(array,100);
    try
    {
        localStorage.setItem(moduleID,Text);
        return "OK";
    }
    catch (err)
    {
        alert('File saved error');
    }
}

function s_encode(str,code) {
    var encoded = "";
    for (i=0; i<str.length;i++) {
        var a = str.charCodeAt(i);
        var b = a ^ code;
        encoded = encoded+String.fromCharCode(b);
    }
}
```

```
function g_encode(grade) {
    return (grade+174)*100;
}
//menampilkan nilai tertinggi berdasarkan kemiripan dengan hafalan
function g_decode(higrade) {
    return ((higrade)/100 -174);
}
var myArray = new Array();

//menghasilkan array dengan text yang dimasukkan dan mengubahnya menjadi
symbol * (password)
function generate_array(number){
    var text = "*";
    for (i=1;i<number;i++){
        if (i==number){break;}
    text = text + ',';
        myArray[i] ='*';
        text = text + myArray[i];
    }
    return text;
}

//membuat array dalam bentuk teks
function array_toText(myArray,length){
    var string = myArray[0];
    for (i=1;i<length;i++){
        string = string + "," + myArray[i];
    }
    return string;
}
```

```
function stringToHex (tmp) {
  var str = "",
      i = 0,
      tmp_len = tmp.length,
      c;
  for (; i < tmp_len; i += 1) {
    c = tmp.charCodeAt(i);
    str += d2h(c) + ' ';
  }
  return str;
}

//mengubah jenis hex ke jenis string untuk kode karakter
function hexToString (tmp) {
  var arr = tmp.split(' '),
      str = "",
      i = 0,
      arr_len = arr.length,
      c;

  for (; i < arr_len; i += 1) {
    c = String.fromCharCode( h2d( arr[i] ) );
    str += c;
  }
  return str;
}

//memanggil d2h dan mengkonvert ke string
function d2h(d) {
  return d.toString(16);
}
```

```

function h2d (h) {
    return parseInt(h, 16);
}

//sebagai proses validasi password dan username yang terdapat di halaman
login
function passValidation(url,json,object){
    CLO['Loading'].Show({ bMaster: true });
    $(document).ready(function(){
        $.ajax({
            crossDomain: true,
            url: url,
            method: 'POST',
            dataType: 'text',
            data: json,
            success: function (response) {
                if (response == "VALID"){
                    updateFile();
                    CL.Navigation.GoTo({ sTargetType: "slide", sTargetDir: "next"
});
                    CLO['Loading'].Hide({ bMaster: true });
                }
                if (response == "INVALID"){
                    alert("Username atau Password tidak sah");
                    CLO['Loading'].Hide({ bMaster: true });
                }
            },
            error: function (error) {
                CLO['Loading'].Hide({ bMaster: true });
                alert("Jaringan error, code: " + error.status);
            }
        });
    });
}

```

```
function updateFile()
{

    var text = read_file();
    var array = text.split(',');
    array[3]="VALID";
    var Text = array_toText(array,array.length);
    try
    {
        localStorage.setItem(moduleID,Text);
        return "Validation is done";
    }
    catch (err)
    {
        alert('File saved error');
    }
}
```

//mengumpulkan hasil nilai siswa untuk setiap chapter

```
function store_score(dom, chapter, score)
```

```
{
    var textfile = dom;
    var updatedStudentData = "";
    array = textfile.split(',');
    for(i=4;i<99;i++)
    {
        if (array[i] == chapter)
        {
            array[i+2] = score;
            break;
        }
    }
}
```

```
for(i=0;i<array.length;i++){
    if(i==array.length){break;}
    updatedStudentData += array[i] + ',';
}
sendScoredData(updatedStudentData);
}
function store_data(chapter, text)
{
    var textfile = read_file();
    array = textfile.split(',');
    var counter = 0;
    for(i=4;i<99;i++)
    {
        if ((array[i] == '*' ) | (array[i] == chapter))
        {
            counter = i;
            break;
        }
    }
    var Textfilebaru = "";
    array[counter] = chapter;
    array[counter + 1] = text;
    for(i=0;i<array.length;i++){
        Textfilebaru += array[i] + ',';
    }
    try {
        localStorage.setItem(moduleID,Textfilebaru);
        return "OK"; }
    catch (err) {
        alert('File saved error');
    }
}
```

```
function sendDataPost(){
    var url = url_update();
    var json = read_file();
    var passvar = "onlinetext="+json;
    $(document).ready(function(){
        $.ajax({
            crossDomain: true,
            url: url,
            method: 'POST',
            dataType: 'text',
            data: passvar,
            success: function() {
            },
            error: function() {
            }
        });
    });
}

//membuat tampilan halaman menjadi halaman yang sudah diset sebelumnya
function htmlCode(text){
    var buffer = "";
    var loop = "TRUE"
    while (loop){
        buffer = text.replace(';', '@@@');
        if (buffer == text) {break;}
        text = buffer;
    }
    return buffer;
}
```

```
function htmlDeCode(text){
    var buffer = "";
    var loop = "TRUE"
    while (loop){
        buffer = text.replace('@@@','');
        if (buffer == text) {break;}
        text = buffer;
    }
    return buffer; }

function getStudentReport(NIM){ var Course = moduleID;
    var url = url_send();
    var passvar= "user_id=" + NIM + "&" + "course_code=" + Course;
        $(document).ready(function(){
            $.ajax({
                crossDomain: true,
                url: url,
                method: 'POST',
                dataType: 'text',
                data: passvar,
                success: function (response) {
                    },
                error: function (error) {
                    }
            });
        });
    }

function showAssignment(){
    var data = read_file();
    var array = data.split(",");
    var text = "";
    var number = 0;
```



```

for (i=4;i<array.length;i+=2){
    number++;
    if ((array[i]=="*")(array[i+1]=="*")){ break;}
    text += "<tr></tr>";
    text += "<td>"+number+"</td>";
    text += "<td>"+array[i].substring(3,6)+"</td>";
    var status = "";
    if (array[i+1]=='1'){status = "selesai";}
    text += "<td>"+status+"</td>";
    text += "</tr>";
}
return text;
}

var canvas,ctx;
var mouseX,mouseY,mouseDown=0;
var touchX,touchY;
var lastX=-1,lastY=-1;
function drawDot(ctx,x,y,size){
    r=255; g=0; b=0; a=255;
    ctx.fillStyle = "rgba("+r+","+g+","+b+","+a/255+")";
    ctx.beginPath();
    ctx.arc(x, y, size, 0, Math.PI*2, true);
    ctx.closePath();
    ctx.fill();
    lastX=-1;
    lastY=-1; };
function drawLine(ctx,x,y,size) {
    if (lastX===-1) {
        lastX=x;
        lastY=y;

```

```

r=255; g=0; b=0; a=255;
    ctx.strokeStyle = "rgba("+r+", "+g+", "+b+", "+(a/255)+)";
    ctx.lineCap = "round";
    ctx.beginPath();
        ctx.moveTo(lastX,lastY);
        ctx.lineTo(x,y);
    ctx.lineWidth = size;
    ctx.stroke();
        ctx.closePath();
    lastX=x;
        lastY=y;
}
//Membersihkan/menghapus canvas
function clearCanvas(canvas,ctx) {
    ctx.clearRect(0, 0, canvas.width, canvas.height);
}
//membuat garis jika kursor turun
function sketchpad_mouseDown() {
    mouseDown=1;
    drawDot(ctx,mouseX,mouseY,3);
}
function sketchpad_mouseUp() {
    mouseDown=0;
    lastX=-1;
    lastY=-1;}
//memanggil fungsi getMousePos(e) untuk mengaktifkan penggambaran
function sketchpad_mouseMove(e) {
    getMousePos(e);
    if (mouseDown==1) {
        drawLine(ctx,mouseX,mouseY,4);
    }
}

```

```

function sketchpad_touchStart() {
    getTouchPos();
        drawDot(ctx,touchX,touchY,3);
    event.preventDefault();
}
//digunakan untuk mobile untuk mendapatkan posisi saat selesai menggambar
function sketchpad_touchEnd() {
    lastX=-1;
    lastY=-1;
}
//digunakan untuk mobile untuk mendapatkan posisi touch
function sketchpad_touchMove(e) {
    getTouchPos(e);
    drawLine(ctx,touchX,touchY,4);
    event.preventDefault();}
//untuk mendapatkan posisi touch
function getTouchPos(e) {
    if (!e)
        var e = event;
    if(e.touches) {
        if (e.touches.length == 1) {
            var touch = e.touches[0];
            touchX=touch.pageX-touch.target.offsetLeft;
            touchY=touch.pageY-touch.target.offsetTop;
        } }
}
function imageLoad(surahImagef){
    var canvas1 = document.getElementById('myCanvas1');
    var context1 = canvas1.getContext('2d');
    var canvas2 = document.getElementById('myCanvas2');
    var context2 = canvas2.getContext('2d');

```

```

var canvas3 = document.getElementById('myCanvas3');
var context3 = canvas3.getContext('2d');
var image1 = new Image();
image1.src = surahImagef;
image1.onload = function() {
    context1.drawImage(image1, 0, 0);
    context2.drawImage(image1, 0, 0);
    context3.drawImage(image1, 0, 0);}
canvas2.style.display="none";
canvas3.style.display="none";}

//mengambil audio file dari sumber
function soundLoad(surahSoundf){
    source=document.getElementById("sound");
    source.src=surahSoundf;}

//mengambil hasil coretan jika user menggambar dan terdapat button untuk
reload dan next
function paint(surahImagef,surahSoundf,code) {
    canvas = document.getElementById('myCanvas1');
    if (canvas.getContext)
        ctx = canvas.getContext('2d');
    if (ctx) {
        canvas.addEventListener('mousedown', sketchpad_mouseDown, false);
        canvas.addEventListener('mousemove', sketchpad_mouseMove, false);
        window.addEventListener('mouseup', sketchpad_mouseUp, false);
        canvas.addEventListener('touchstart', sketchpad_touchStart, false);
        canvas.addEventListener('touchmove', sketchpad_touchMove, false);
    }

    imageLoad(surahImagef);
    soundLoad(surahSoundf);
    codeLoad(code);
    document.getElementById("button-reload").style.display='none';
    document.getElementById("button-next").style.display='none';

```

```

function calculate(){
    document.getElementById("button-next").style.display='none';
    document.getElementById("button-result").style.display='none';
    document.getElementById("button-reload").style.display='block';
    imageSave();
    var canvas1 = document.getElementById('myCanvas1'); //awal
    var context1 = canvas1.getContext('2d');
    var canvas2 = document.getElementById('myCanvas2'); //hasil coret
    var context2 = canvas2.getContext('2d');
    var canvas3 = document.getElementById('myCanvas3');
    //perbandingan
    var context3 = canvas3.getContext('2d');
    var blackTotal = 0;
    var high = localStorage.getItem("y-high");
    var imageData2 = context2.getImageData(0,0,420,high);
    var dataArray2 = imageData2.data
    var dlength = dataArray2.length;
    rgbArray2 = [];
    for (var i=0; i<dlength; i+=4) { //mengubah keadlam array
        rgbArray2[i]=dataArray2[i];
        rgbArray2[i+1]=dataArray2[i+1];
        rgbArray2[i+2]=dataArray2[i+2];
        rgbArray2[i+3]=dataArray2[i+3];}
    //garis ayat dalam gambar
    for (var i=0; i<dlength; i+=4) {
        if (
            (rgbArray2[i]<10)&
            (rgbArray2[i+1]<10)&
            (rgbArray2[i+2]<10)
        ){
            blackTotal++;

```

```

diff = imagediff.diff(myCanvas1,myCanvas2); // perbandingan canvas1 dan
canvas2

context3.putImageData(diff, 0, 0);

var redTotal = 0;
var high = localStorage.getItem("y-high");
var imageData3 = context3.getImageData(0,0,420,high);
var dataArray3 = imageData3.data
var dlength = dataArray3.length;
rgbArray3 = [];
for (var i=0; i<dlength; i+=4) {
    rgbArray3[i]=dataArray3[i];
    rgbArray3[i+1]=dataArray3[i+1];
    rgbArray3[i+2]=dataArray3[i+2];
    rgbArray3[i+3]=dataArray3[i+3];}

//garis yang digambar
for (var i=0; i<dlength; i+=4) {
    if (
        (rgbArray3[i]>250)&
        (rgbArray3[i+1]<10)&
        (rgbArray3[i+2]<10)
    ){
        redTotal++;
    }
}

var crossTotal=0; // banyak garis gambar yang dilewati
for (var i=0; i<dlength; i+=4) {
    if ((
        (rgbArray2[i]<10)&
        (rgbArray2[i+1]<10)&
        (rgbArray2[i+2]<10)
    )

```

```

        &
        (
            (rgbArray3[i]>250)&
            (rgbArray3[i+1]<10)&
            (rgbArray3[i+2]<10)
        ))
        {
            crossTotal++;
        }
    }
    var percent = 100 - ((blackTotal-crossTotal)/blackTotal)*100;
    var sPercent = percent.toFixed(0);
    diff = imagediff.diff(myCanvas1,myCanvas2);
context3.putImageData(diff, 0, 0);
    var redTotal = 0;
    var high = localStorage.getItem("y-high");
    var imageData3 = context3.getImageData(0,0,420,high);
    var dataArray3 = imageData3.data
    var dlength = dataArray3.length;
    rgbArray3 = [];
    for (var i=0; i<dlength; i+=4) {rgbArray3[i]=dataArray3[i];
        rgbArray3[i+1]=dataArray3[i+1];
        rgbArray3[i+2]=dataArray3[i+2];
        rgbArray3[i+3]=dataArray3[i+3]; }
    for (var i=0; i<dlength; i+=4) {
        if (
            (rgbArray3[i]>250)&
            (rgbArray3[i+1]<10)&
            (rgbArray3[i+2]<10)
        ){redTotal++;}

```

```
var crossTotal=0; //tisan = asli
    for (var i=0; i<dlength; i+=4) {
        if (((rgbArray2[i]<10)&
            (rgbArray2[i+1]<10)&
            (rgbArray2[i+2]<10))
            &
            ((rgbArray3[i]>250)&
            (rgbArray3[i+1]<10)&
            (rgbArray3[i+2]<10)
            ))
        {
            crossTotal++;
        }
    }
var slipTotal=0; // tulisan melewati asli
for (var i=0; i<dlength; i+=4) {
    if ((
        (rgbArray2[i]>240)&
        (rgbArray2[i+1]>240)&
        (rgbArray2[i+2]>240)
        )
        &
        (
            (rgbArray3[i]<10)&
            (rgbArray3[i+1]>200)&
            (rgbArray3[i+2]>200)
            ))
    {
        slipTotal++;
    }
}
```



```

if (percent<5){
    alert("Bismillah, ayo semangat nulis!");}
    if ((percent>=5)&&(percent<25)){alert("Alhamdulillah, lanjutkan
    lagi");};
    if ((percent>=25)&&(error>0.2)){
        document.getElementById("button-next").style.display='block';
        document.getElementById("button-result").style.display='none';
        document.getElementById("button-
        reload").style.display='none';
    }

    context1.putImageData(diff, 0, 0);
    total_score += percent/7;
    total_score = total_score.toFixed(3);
}

//menampilkan halaman ayat berikutnya dan jika sudah sampai di halaman
akhir akan langsung ke halaman hasil
function nextSlide(){
    document.getElementById("button-next").style.display='block';
    document.getElementById("button-result").style.display='none';
    document.getElementById("button-
    reload").style.display='none';
    var chapter = localStorage.getItem("code");
    var score = 1;
    store_data(chapter, score);
    store_data("score",total_score);
    parent.sendDataPost();
    parent.CL.Navigation.GoTo({ sTargetType: "slide", sTargetDir:
    "next" });
}
function saveNext(){
    try {
        localStorage.setItem("varnext", "true");
    }
}

```

```

function clearNext(){
    try {
        localStorage.setItem("varnext", "false");
    }
    catch (e) {} };
//menampilkan hasil kerja sebelumnya
function showResult(){
    var canvas4 = document.getElementById('myCanvas4');
    var context4 = canvas4.getContext('2d');
    diff = imagediff.diff(myCanvas1,myCanvas2);
    context4.putImageData(diff, 0, 0);
    canvas4.style.display="none";}
//menyimpan hasil dari canvas1 data url
function imageSave(){
    var canvas1 = document.getElementById('myCanvas1');
    var thisCode = localStorage.getItem("code");
    try {
        localStorage.setItem(thisCode, canvas1.toDataURL());
    }
    catch (e) {} }
//membuat ulang/menghapus canvas yang digambar dengan menampilkan
gambar semula
function imageClear(){
    var canvas1 = document.getElementById('myCanvas1');
    var context1 = canvas1.getContext("2d");
    var image1 = new Image();
    var surahImagef = localStorage.getItem("image");
    image1.src = surahImagef;
    image1.onload = function() {
        context1.drawImage(image1, 0, 0);
    }
}

```

```

function imageReload(){
    var canvas1 = document.getElementById('myCanvas1');
    var context1 = canvas1.getContext("2d");
    var thisCode = localStorage.getItem("code");
    var imgAsDataURL = localStorage.getItem(thisCode);
    var img = new Image;
    img.src = imgAsDataURL;
    img.onload = function(){
        context1.drawImage(img, 0, 0);
    }
    document.getElementById("button-result").style.display='block';
    document.getElementById("button-next").style.display='none';
    document.getElementById("button-reload").style.display='none';
}

(function (name, definition) {
    var root = this;
    if (typeof module !== 'undefined') {
        try {var Canvas = require('canvas');} // require untuk
mengimport canvas
        catch (e) {throw new Error();}
        module.exports = definition(root, name, Canvas);
    }
    else if (typeof define === 'function' && typeof define.amd ===
'object') {
        define(definition);
    }
    else {root[name] = definition(root, name);}
})

('imagediff', function (root, name, Canvas) {
    var
        TYPE_ARRAY    = /^[object Array]/i,

```

```

        UNDEFINED      = 'undefined',
        canvas         = getCanvas(),
        context        = canvas.getContext('2d'),
        previous       = root[name],
        imagediff,
        jasmine;
function getCanvas (width, height) {
    var canvas = Canvas ?
        new Canvas() : document.createElement('canvas');
        if (width) canvas.width = width;
        if (height) canvas.height = height;
        return canvas;
    }
    function getImageData (width, height) {
        canvas.width = width;
        canvas.height = height;
        context.clearRect(0, 0, width, height);
        return context.createImageData(width, height);
    }
    function getCanvasRef() {
        return Canvas;
    }
function isImage (object) {
    return isType(object, TYPE_IMAGE);
}
function isCanvas (object) {
    return isType(object, TYPE_CANVAS);
}
function isContext (object) {
    return isType(object, TYPE_CONTEXT);
}

```

```
function isImageData (object) {
    return !(object &&
        isType(object, TYPE_IMAGE_DATA) &&
        typeof(object.width) !== UNDEFINED &&
        typeof(object.height) !== UNDEFINED &&
        typeof(object.data) !== UNDEFINED);}

function isImageType (object) {
    return (
        isImage(object) ||
        isCanvas(object) ||
        isContext(object) ||
        isImageData(object)
    );}

function isType (object, type) {
    return typeof (object) === 'object' &&
    !!Object.prototype.toString.apply(object).match(type);
}

function copyImageData (imageData) {
    var
        height = imageData.height,
        width = imageData.width,
        data = imageData.data,
        newImageData, newData, i;
    canvas.width = width;
    canvas.height = height;
    newImageData = context.getImageData(0, 0, width,
height);
    newData = newImageData.data;
    for (i = imageData.data.length; i--;) {
        newData[i] = data[i];}
    return newImageData;
}
```

```
function toImageData (object) {
    if (isImage(object)) { return toImageDataFromImage(object); }
    if (isCanvas(object)) { return toImageDataFromCanvas(object); }
}

    if (isContext(object)) { return
toImageDataFromContext(object); }
    if (isImageData(object)) { return object; }
}
//konvert image jadi imageData
function toImageDataFromImage (image) {
    var
        height = image.height,
        width = image.width;
        canvas.width = width;
        canvas.height = height;
        context.clearRect(0, 0, width, height);
        context.drawImage(image, 0, 0);
    return context.getImageData(0, 0, width, height);}
//konvert canvas ke imageData
function toImageDataFromCanvas (canvas) {
    var height = canvas.height,
        width = canvas.width,
        context = canvas.getContext('2d');
    return context.getImageData(0, 0, width, height);}
//konvert context ke imageData
function toImageDataFromContext (context) {
    var
        canvas = context.canvas,
        height = canvas.height,
        width = canvas.width;
    return context.getImageData(0, 0, width, height);}
```

```

function toCanvas (object) {
    var
        data = toImageData(object),
        canvas = getCanvas(data.width, data.height),
        context = canvas.getContext('2d');
        context.putImageData(data, 0, 0);
    return canvas;}

//menyelaraskan lebar gambar data a dengan b
function equalWidth (a, b) {
    return a.width === b.width;}

//menyelaraskan tinggi gambar data a dengan b
function equalHeight (a, b) {
    return a.height === b.height;}

//menyelaraskan dimensi gambar data a dengan b
function equalDimensions (a, b) {
    return equalHeight(a, b) && equalWidth(a, b); }

//menyamakan data gambar a dan b dengan toleransi yang diatur
function equal (a, b, tolerance) {
    var
        aData = a.data,
        bData = b.data,
        length = aData.length,
        i;
        tolerance = tolerance || 0;
    if (!equalDimensions(a, b))
        return false;
    for (i = length; i--;)
        if (aData[i] !== bData[i] && Math.abs(aData[i] -
bData[i]) > tolerance) return false;
    return true;
}

```

```

function diff (a, b, options) {
    return (equalDimensions(a, b) ? diffEqual : diffUnequal)(a, b,
options);}
    //membandingkan data a dan b dengan pengurangan kemudian
menjadi data c
    function diffEqual (a, b, options) {
        var height = a.height,
            width = a.width,
            c = getImageData(width, height), // c = a - b
            aData = a.data,
            bData = b.data,
            cData = c.data,
            length = cData.length,
            row, column,
            i, j, k, v;
        for (i = 0; i < length; i += 4) {
            cData[i] = Math.abs(aData[i] - bData[i]); // abs
mengembalikan nilai + untuk jenis data
            cData[i+1] = Math.abs(aData[i+1] - bData[i+1]);
            cData[i+2] = Math.abs(aData[i+2] - bData[i+2]);
            cData[i+3] = Math.abs(255 - Math.abs(aData[i+3] -
bData[i+3]));}
        return c;}
    //mengimbangi data a dan b yang dimensinya tidak memenuhi kriteria
ukuran
    function diffUnequal (a, b, options) {
        var height = Math.max(a.height, b.height), //memaksimalkan
ukuran
            width = Math.max(a.width, b.width),
            c = getImageData(width, height), // c = a - b
            aData = a.data,
            bData = b.data,
            cData = c.data,

```



```

        columnOffset,
        row, column,
        i, j, k, v;
    for (i = cData.length - 1; i > 0; i = i - 4) //mengatur ukuran data
c
    {
        cData[i] = 255;
    }
    offsets(a); // penyesuaian untuk data a
    for (row = a.height; row--;){
        for (column = a.width; column--;){
            i = 4 * ((row + rowOffset) * width + (column +
columnOffset));

            j = 4 * (row * a.width + column);
            cData[i+0] = aData[j+0];
            cData[i+1] = aData[j+1];
            cData[i+2] = aData[j+2];
            // cData[i+3] = aData[j+3]; //

        }
    }
    offsets(b); // penyesuaian untuk data b
    for (row = b.height; row--;){
        for (column = b.width; column--;){
            i = 4 * ((row + rowOffset) * width + (column +
columnOffset));

            j = 4 * (row * b.width + column);
            cData[i+0] = Math.abs(cData[i+0] - bData[j+0]);
// r
            cData[i+1] = Math.abs(cData[i+1] - bData[j+1]);
// g
            cData[i+2] = Math.abs(cData[i+2] - bData[j+2]);
// b

```

```

        } else {
            rowOffset = Math.floor((height -
imageData.height) / 2);
            columnOffset = Math.floor((width -
imageData.width) / 2);
        }
    }
    return c; }
function checkType () {
    var i;
    for (i = 0; i < arguments.length; i++) {
        if (!isImageType(arguments[i])) {
            throw {
                name : 'ImageTypeError',
                message : 'Submitted object was not an
image.'
            };}}
}

function get (element, content) {
    element = document.createElement(element);
    if (element && content) {
        element.innerHTML = content;
    }
    return element;
}
jasmine = {
    toBeImageData : function () {
        return imagediff.isImageData(this.actual);
    }, toImageDiffEqual : function (expected, tolerance) {
        if (typeof (document) !== UNDEFINED) {
            this.message = function () {
                var

```

```

        div    = get('div'),
        a      = get('div', '<div>Actual:</div>'),
//asli
        b      = get('div',
'<div>Expected:</div>'), //coretan
//perbandingan gambar
        diff   = imagediff.diff(this.actual,
expected), //perbandingan coretan sama asli

        canvas = getCanvas(),
        context;
        canvas.height = diff.height;
        canvas.width  = diff.width;
        div.style.overflow = 'hidden';
        a.style.float = 'left';
        b.style.float = 'left';
        c.style.float = 'left';
        context = canvas.getContext('2d');
        context.putImageData(diff, 0, 0);
        a.appendChild(toCanvas(this.actual));
        b.appendChild(toCanvas(expected));
        c.appendChild(canvas);
        div.appendChild(a);
        div.appendChild(b);
        div.appendChild(c);
        return [
            div,
            "Expected not to be equal."
        ];
    };}

    return imagediff.equal(this.actual, expected, tolerance);
}

```

```

imagediff = { createCanvas : getCanvas,
              createImageData : getImageData, //penyamaan
              getCanvasRef: getCanvasRef,
              isImage : isImage,
              isCanvas : isCanvas,
              isContext : isContext,
              isImageData : isImageData,
              isImageType : isImageType,
              toImageData : function (object) {
                checkType(object);
                if (isImageData(object)) { return copyImageData(object); }
                return toImageData(object);},
              //penyelarasan
              equal : function (a, b, tolerance) {
                checkType(a, b);
                a = toImageData(a);
                b = toImageData(b);
                return equal(a, b, tolerance);}, //perbandingan
              diff : function (a, b, options) {
                checkType(a, b);
                a = toImageData(a);
                b = toImageData(b);
                return diff(a, b, options);},
              jasmine : jasmine,
              noConflict : function () {
                root[name] = previous;
                return imagediff;}};
if (typeof module !== 'undefined') {
  imagediff.imageDataToPNG = imageDataToPNG;}
return imagediff;

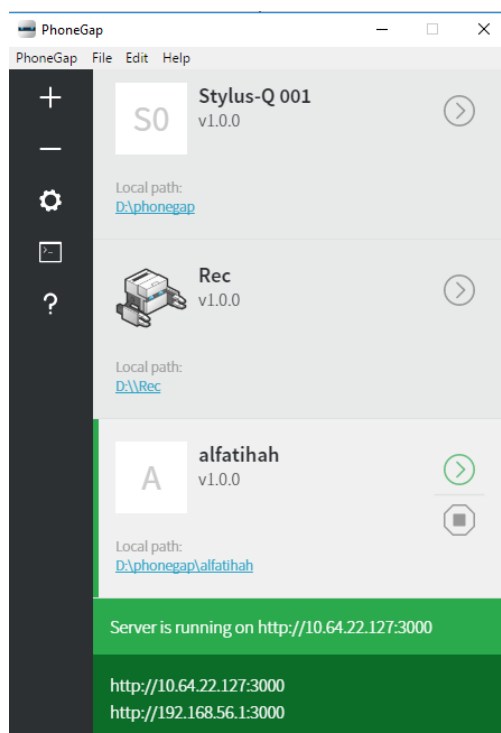
```

## 2. Surah Al-Fatihah, Ayat 1-7 dan Terjemahan

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ	بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ 1 Maha Penayang Yang Maha Pengasih Allah Dengan nama
الْحَمْدُ لِلَّهِ رَبِّ الْعَالَمِينَ	الْحَمْدُ لِلَّهِ رَبِّ الْعَالَمِينَ 2 seluruh alam Tuhan bagi Allah Segala puji
الرَّحْمَنِ الرَّحِيمِ	الرَّحْمَنِ الرَّحِيمِ 3 Maha Penayang Yang Maha Pengasih
مَلِكِ يَوْمِ الدِّينِ	مَلِكِ يَوْمِ الدِّينِ 4 pembalasan hari Pemilik
إِيَّاكَ نَعْبُدُ وَإِيَّاكَ نَسْتَعِينُ	إِيَّاكَ نَعْبُدُ وَإِيَّاكَ نَسْتَعِينُ 5 kami memohon pertolongan dan hanya kepada Engkau lah kami menyembah
أَهْدِنَا الصِّرَاطَ الْمُسْتَقِيمَ	أَهْدِنَا الصِّرَاطَ الْمُسْتَقِيمَ 6 yang lurus jalan Tunjukilah kami
صِرَاطَ الَّذِينَ أَنْعَمْتَ عَلَيْهِمْ	صِرَاطَ الَّذِينَ أَنْعَمْتَ عَلَيْهِمْ kepada mereka telah Engkau anugerahkan nikmat kepada mereka orang-orang yang (yaitu) jalan
غَيْرِ الْمَغْضُوبِ عَلَيْهِمْ وَلَا الضَّالِّينَ	غَيْرِ الْمَغْضُوبِ عَلَيْهِمْ وَلَا الضَّالِّينَ 7 mereka yang sesat dan bukan (pula jalan) kepada mereka mereka yang dimurkai bukan (jalan)

## 3. Pembuatan APK

Pembuatan APK dilakukan setelah *publish* di CourseLab, kemudian dijalankan dengan menggunakan PhoneGap.



#### 4. Konferensi

- Submit *Full-Paper*

### THE DEVELOPMENT OF QUR'AN WRITING APPLICATION FOR MOBILE LEARNING

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**Abstract:** Writing is a language activity for pouring ideas or concepts. We can write in the form of character or number a systematic way so that we can understand the subject more accessible. Writing is one of the essential abilities in the learning process, besides the abilities to read and to memorize. Learning and understanding the Qur'an is the main exercises in Qur'an subject. However, with the development of technology such as smartphones, writing habits can shift from book to device. That is due to the convenience and practicality offered by smartphones such as the writing can be written repeatedly, and can be done anywhere and anytime compared to traditional writing. and the result is their ability to write with their hands is lower than their reading ability. We can see in the Qur'anic studying, student writing ability is less than the ability to read and memorize. In this research mobile learning applications used as one of the solutions to improve writing skills, because the benefits of this mobile learning application. The smartphone potentially to enhance as the complement of writing subject. The positive impact of writing Al-Qur'an character using smartphone is that we can calculate the similarity. This method reduce the teacher task in evaluate of student activity.

**Keywords:** Al-Qur'an, Mobile Learning, Writing

## 1. INTRODUCTION

Writing is an important part of the learning process to pour ideas or thought along to reflect existing knowledge and experiences with written language [1][2]. However, the habit of writing during learning began to be replaced with digital writing or typing. The caused is the development of technology such as smartphones that make most students can not be separated from their smartphones. Even the research reveals that the level of student addiction to smartphones is higher than internet addiction [3]. Most students assume that writing is performed at a particular condition only, and many of them prefer to type their essays compared to writing it [4]. Though students can remember better when writing by hand because most mental and verbal processes that involve emotions thinking, and speaking are used in writing while writing digitally can negatively affect their performance in doing a task [5], [6].

The level of writing the Qur'an is also relatively low because the Arabic writing system that starts from right to the left caused difficulties for students who are familiar with the Latin writing system [7], [8]. In the case of the practice of writing the Qur'an one of the common methods that often used is by *imla'i/ imlak*, namely writing letters according to their correct position in words to prevent the occurrence misconception of meaning [9], [10]. Therefore, a specific exercise book is needed to apply the method, "Follow the Line" is a method that lately popular and resembles the method of imitation because students are only asked to write the Qur'an merely following the lines or patterns. However, exercise books like this are fairly wasteful and not environmentally friendly because they have to print sheets multiple times. Aside from that, other things become an obstacle, such as the scoring from the exercise result is still manual, so the score is not too accurate and time-consuming. Also, students usually still have to be accompanied by a person who understands about writing the Qur'an.

Nowadays, the use of mobile learning is one of the learning support that can be accessed almost anywhere and anytime [11] as well as cellular technology that offers to learn to all ages of the students without being bound by place and time [12]. It showed that students are more willing to learn with cellular technology [13]. Also, they can improve their learning achievement and motivation because the information from mobile learning seems more attractive to learning, not to mention learning can be done both formally and informally [14]–[16]. This offers much broader educational potential than just accessing resources [16] because the use of mobile learning can help cost efficiency, instant portability, sensitivity context, better use of idle time, ease of organizing dates, and certainly flexibility and convenience [11], [17]. If concluded, mobile learning is one of cellular technology as a medium to help to learn both formally and informally that can be accessed anywhere anytime.

Therefore, we developed a mobile application for learning that can display writing on verses in the Qur'an. We also added features so that students can write by following the letter line only. Then, the results that obtained from the accuracy will display in the form of a percentage. The advantages of developing this application are for learning to write numbers and letters. This can be applied to writing lessons in the first year of K-12 students, especially for lessons to introduce numbers and Latin writing.

## 2. APPLICATION DESIGN

We developed the application of the mobile learning module and name it "Stylus-Q" it is easy for people to remember. The main purpose of developing this application is to assist *users* to learn writing the Qur'an and at once build people's affection to the Qur'an. We designed this using an Android-based application because it will use the current technology to improve their efficiency [18]. Also, it makes students interested to learn the material given quickly and it can access anytime and anywhere [19].

This application was developed using CourseLab software as an implementation of learning media. The use of PhoneGap is a useful solution for building mobile applications using modern web programming languages, such as HTML, HTML5, CSS, and JavaScript rather than using other known languages such as C# or Java [20]. The results of this combination are APK files that can be run on smartphones.

In this application, we design a system architecture first to describe the structure, interaction, and technology of computer system components [21] (Figure 1). After that, to meet the required requirements, we designed a system regarding how the process works in the student modules (Figure 2).

Figure 1 is an architectural design of the Stylus-Q application where the system is made using HTML5, JavaScript, CSS, and Resources which functions to make the program display structure, logic, and interactions that occur within the application system. After that, PhoneGap will convert and compile the module and enter the server. For student modules that use Stylus, the module will display data into the form of Input, Graphics, and Services in the mobile applications. The Input data carried data when *user* tries to write using Stylus-Q and sends it to the server, then the data in the Graphics category is to make system displays verses that *user* need to write along with the results of *user's* writing, and data that include in Services are all features that applied in the system. For the teacher module, the module will create a PhoneGap Native API with plug-ins in the form of media, network, file, notification, storage, and custom plug-ins. We also added an API of Whatsapp and Telegram in the teacher module for communication purposes.

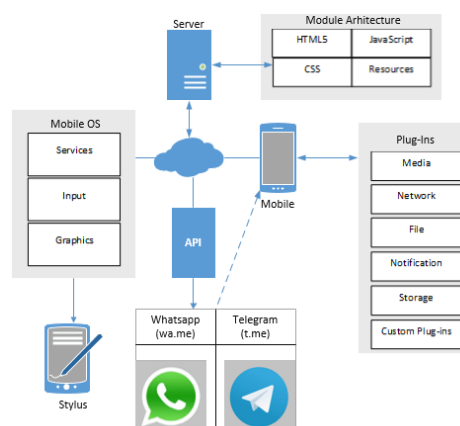


Figure 1. System Architecture

In the Figure 2, illustrates how the process occurs in system design. The first stage is. both the writing of the *user* and the original text are converted into an array. Then, the system will combine and compare the accuracy of the array from the *user* with the original. Comparison in the form of a number of the *user's* writing accuracies with the original writing will determine the system to decide the next stage whether to go to the next verse or not. The decision is based on estimation of the accuracy of the *user's* writing with the original writing. Finally, the score is obtained by the total score divided by the number of verses worked on.

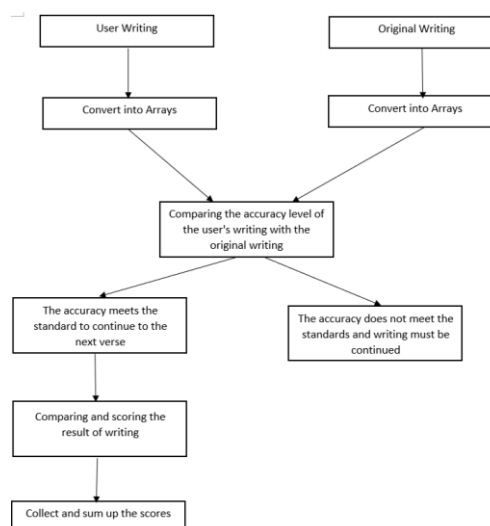


Figure 2. System Design

### 3. RESULTS AND DISCUSSION



In this paper, we develop two modules, the teacher module, and the student module. Figure 3 is a teacher module. This module intends to provide instructional support and increase functionality to increase interaction between teachers and students [22]. For this reason, this module functions to monitor and collect student grades after students have finished their work and the teacher can do feedback because there are links in the form of Whatsapp and Telegram numbers to communicate directly with students privately.



No	Nama	WhatsApp	Aktivitas	Score
1	Septi	081	score	114.986
2	Siwi	085	score	110.329
3	Herlan	081	score	0
4	Arowiyah	081	score	0
5	Slamet	087	score	0
6	Retno	087	score	0
7	Dwi Hastuti	085	score	0
8	Nun	085	score	0
9	Wafiriyah	082	score	0
10	Rokini	081	score	0
11	Noor	089	score	0
12	Sidiq Wahyu	085	score	0
13	Nur	081	score	0
14	Hanah Tri	081	score	0
15	Nurlito	085	score	0
16	Muh	081	score	0
17	Jindar	087	score	0
18	Ditya Riani	085	score	0
19	Nur Aini	085	score	0
20	Fera Eka	085	score	0
21	Sumadianto	085	score	0
22	Teguh	08	score	0
23	Reni	085	score	0
24	Nur Huda	089	score	0
25	Nurul	089	score	0
26	Sidiq	081	score	0
27	Arif	081	score	0
28	Lukman	087	score	0

Figure 3. Teacher Module

This paper discusses student modules that function as a learning tool for writing Al-Quran using the Stylus so students can add their writing and learning experiences through practice [23]. As shown in Figure 4, the main display of modules consisting of:

1. Section for learning to write according to the line.
2. Refresh button to repeat writing.
3. Additional features for listening to the verses
4. Button to see the results of writing that had done.

5. Additional features for viewing translate of the current verse in the form of slide buttons.



Figure 4. Student Module

Figure 5 consists of the view of other pages that include on the application. 5a is the view of the application when the registered *user* needs to log in before directed to the learning page (Figure 4). 5b is the view when the *user* attempt to write and the writing is in red.



5a

5b

Figure 5. Login (5a), Writing (5b)

6c is the view that occurs when the *user* wants to see the result of their writing the *user's* writing is cyan, and the accuracy of the *user's* writing is red. Then a button appears to proceed to the next verse. And 6d is the view of the score that *users* obtained from the results of their writing. In 5d we add another button called “refresh” button. When the *user* presses the button, the system will delete the *user* score data and repeat the learning from the beginning.



Figure 6. Comparing writing (6a), Score list (6b)

This application got tested on 30 *users* to find out whether the application has the potential as a tool to help teachers in learning and make students more active by utilizing the latest technology. We measure the standard of speed, accuracy, attraction, and writing interest. Before the test, 30 *users* are asked to write manually using paper and then write using Stylus-Q. This needs to do for comparing the method of writing with conventional and with the Stylus-Q application. The following table is the result that we collected with using a 1-5 scale:

Writing Method	Speed	Correction	Attraction	Interest
Manual	3	3	2	1
Stylus-Q	2	3.5	3.5	4

\*1 = Very low    2 = Low    3 = Moderate    4 = High    5 = Very high

Table 1. Experiment Result

From the results above, it shows the speed in writing using Stylus-Q is low because most *users* still adjust to writing

using applications. For correction, there are no significant differences in the result. However, both in the attraction and interest of use, there are quite significant in using the application.

During the test process, we received some pretty good feedback on the development of this application, including the enthusiasm of *users* to work on the next material, as well as the increasing number of using the app in learning to write, because so far, the *user* still write the verse using the paper

In the same event, we also get limitations from this application, such as the *user's* writing, sometimes not quite right so the *user* can not continue to the next verse. Also, the app can not jump or select particular verses, and sometimes applications can only be run on a certain OS.

## CONCLUSIONS

The development of the Stylus-Q application based on mobile learning as a learning tool for writing the Qur'an proved to be able to increase the *user's* motivation to write, but the practice was still low. According to the results of the conversion that had performed, the data of writing speed using the application are classified as low because the *user* is not familiar with the stylus yet. For correction does not effect because it is only slightly different from the results of writing manually. For attraction of the application, it was showing quite high results. Similarly, with interest, the *users* show interest in writing with the app is high. Furthermore, this application still requires further development in the scoring system and application accessibility.

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- *Acceptance Letter*



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**CONFERENCE ACCEPTANCE**

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*Dear Researcher,*

**Many Congratulations to you!!!!**

We are happy to inform you that your paper entitled **"THE DEVELOPMENT OF QUR'AN WRITING APPLICATION FOR MOBILE LEARNING"** has been selected for **International Conference on Communication, Electrical and Electronics Engineering (ICCEE)** to be held on **11th - 12th Oct 2019, Surabaya, Indonesia**.

**IMPORTANT INFORMATION:**

<b>Paper Title</b>	THE DEVELOPMENT OF QUR'AN WRITING APPLICATION FOR MOBILE LEARNING
<b>Universal paper ID</b> (Note for future communication)	WC-SET-SURBAY A-11109-31
<b>Conference Website</b>	<a href="http://wcset.org/Conference2019/10/Indonesia/1/WCSET/">http://wcset.org/Conference2019/10/Indonesia/1/WCSET/</a>
<b>Last Date of Registration</b>	22nd September, 2019

- *Invitation Letter*

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Date: 09/10/2019

INVITATION LETTER

Dear DWJOKO PURBOHADI,

Greetings from WCSET,

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So we are happy to welcome you for this event to attend and present your research paper on the conference.

Kindly check the official link of Event  
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