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<!DOCTYPE html>
<html>
  <head>
    <title>Fuzzy - Kelayakan Beasiswa</title>

    <meta name="viewport" content="user-scalable=no, initial-scale=1, maximum-scale=1,
    minimum-scale=1, width=device-width">

    <link href="lib/bootstrap/css/bootstrap.min.css" rel="stylesheet">

  </head>
  <body>
    <div class="container" style="margin-top:30px; max-width: 600px; position:relative;">
      <hr>

      <h1>Fuzzy <br><small>Studi Kasus: Kelayakan Beasiswa</small></h1>
      <div class="form-group">
        <label>IPK (0 - 4)</label>
        <input class="form-control" type="text" value="3" id="inIPK"/>
      </div>
      <div class="form-group">
        <label>Gaji (juta) </label>
        <input class="form-control" type="text" value="10" id="inGaji"/>
      </div>

      <button class="btn btn-primary btn-block btn-lg" id="btnProses">Proses</button>

      <div id="divOut">
      </div>

      <hr>
      
      <hr>
      
      <hr>
      <div class="alert alert-success">
      <strong>REFERENSI:</strong>
      <a href="pdf/fuzzy - contoh kasus beasiswa.pdf" target="_blank">
        fuzzy - contoh kasus beasiswa.pdf
      </a>
      </div>
      <hr>
    </div>
    <script src="lib/jquery/jquery.min.js" type="text/javascript" ></script>
    <script src="lib/bootstrap/js/bootstrap.min.js" type="text/javascript" ></script>

    <script type="text/javascript" >
      <!--

      function inDiv(s) {
        return ("<div>" + s + "</div>");
      }

      function lbDiv(lbl,s) {
        return ('<div class="label label-' + lbl + '">' + s + '</div>');
      }

      function alDiv(lbl,s) {
        return ('<div class="alert alert-' + lbl + '">' + s + '</div>');
      }

      //fungsi obj fungsi keanggotaan
      var linier_turun = function(va,vb) {
        this.a = va;
        this.b = vb;
        this.u = function (x) {
          var a=this.a;
          var b=this.b;

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        var y=0;

        if ( (x<a) )      y = 1;
        else if ( (x=>a) && (x<=b) ) y = (b-x)/(b-a);
        else if ( (x>b) )      y = 0;
        return y;
    }
}

var linier_naik = function(va,vb) {
    this.a = va;
    this.b = vb;
    this.u = function (x) {
        var a=this.a;
        var b=this.b;
        var y=0;
        if ( (x<a) )      y = 0;
        else if ( (x=>a) && (x<=b) ) y = (x-a)/(b-a);
        else if ( (x>b) )      y = 1;
        return y;
    }
}

var segitiga = function(va,vb,vc) {
    this.a = va;
    this.b = vb;
    this.c = vc;
    this.u = function (x) {
        var a=this.a;
        var b=this.b;
        var c=this.c;
        var y=0;
        if ( (x<a) || (x>c) )      y = 0;
        else if ( (x=>a) && (x<=b) ) y = (x-a)/(b-a);
        else if ( (x>b) && (x<=c) )      y = (c-x)/(c-b);
        return y;
    }
}

var trapesium = function(va,vb,vc,vd) {
    this.a = va;
    this.b = vb;
    this.c = vc;
    this.d = vd;
    this.u = function (x) {
        var a=this.a;
        var b=this.b;
        var c=this.c;
        var d=this.d;
        var y=0;
        if ( (x<a) || (x>d) )      y=0;
        else if ( (x>=a) && (x<=b) ) y = (x-a)/(b-a);
        else if ( (x>b) && (x<c) )      y=1;
        else if ( (x>=c) && (x<=d) ) y = (d-x)/(d-c);
        return y;
    }
}

//end fungsi obj fungsi keanggotaan

function mf_IPK(x) {
    var buruk = new linier_turun(2, 2.75);
    var cukup = new segitiga(2, 2.75, 3.25);
    var bagus = new linier_naik(2.75, 3.25);

    //return [buruk.u(x), cukup.u(x), bagus.u(x)]
    return {
        "buruk": buruk.u(x),
        "cukup": cukup.u(x),
        "bagus": bagus.u(x)
    };
}

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function mf_gaji(x) {
    var kecil = new linier_turun(1, 3);
    var sedang = new trapesium(1, 3, 4, 6);
    var besar = new trapesium(4, 6, 7, 12);
    var sangatbesar = new linier_naik(7, 12);
    //return [kecil.u(x), sedang.u(x), besar.u(x), sangatbesar.u(x)];
    ;
    return {
        "kecil": kecil.u(x) ,
        "sedang": sedang.u(x) ,
        "besar": besar.u(x) ,
        "sangatbesar": sangatbesar.u(x)
    };
}

function mf_kelayakan(x) {
    var rendah = new linier_turun(50, 80);
    var tinggi = new linier_naik(50, 80);
    //return [rendah.u(x), tinggi.u(x)]
    return {
        "rendah": rendah.u(x),
        "tinggi": tinggi.u(x)
    };
}

function mf_kelayakan_singleton() {
    return {
        "rendah": 50,
        "tinggi": 80
    };
}

function fmin(a,b) {
    return Math.min(a,b);
}

function fmax(arr) { //arr
    var a=0;
    for (var i in arr) {
        a = Math.max(a,arr[i]);
    }
    return a;
}

function fmaxMin(a,b,c,d) {
    return Math.max( Math.min(a,b) , Math.min(c,d));
}

function fcog(a, b) {
    for (var i=0; i<i; i+=10) {

    }
}

function klik_proses() {
    //alert('ok');
    //var ipk = 3;
    var ipk = parseFloat( $('#inIPK').val() );
    console.log( 'ipk : ' + ipk );

    ipk = mf_IPK( ipk );
    console.log( ipk );

    //var gaji = 10;
    var gaji = parseFloat( $('#inGaji').val() );
    console.log( 'gaji : ' + gaji );

    gaji = mf_gaji( gaji );
    console.log( gaji );
}

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var rendah = [];
var tinggi = [];

//aturan / rules
rendah.push( fmin( ipk.buruk, gaji.kecil ) );
rendah.push( fmin( ipk.buruk, gaji.sedang ) );
rendah.push( fmin( ipk.buruk, gaji.besar ) );
rendah.push( fmin( ipk.buruk, gaji.sangatbesar ) );

tinggi.push( fmin( ipk.cukup, gaji.kecil ) );
rendah.push( fmin( ipk.cukup, gaji.sedang ) );
rendah.push( fmin( ipk.cukup, gaji.besar ) );
rendah.push( fmin( ipk.cukup, gaji.sangatbesar ) );

tinggi.push( fmin( ipk.bagus, gaji.kecil ) );
tinggi.push( fmin( ipk.bagus, gaji.sedang ) );
tinggi.push( fmin( ipk.bagus, gaji.besar ) );
rendah.push( fmin( ipk.bagus, gaji.sangatbesar ) );

tinggi = fmax(tinggi);
rendah = fmax(rendah);

//defuzz mamdani
var sa = 0;
var sb = 0;
var aa = 10;
for (var i=aa; i<=100; i+=aa) {
    layak = mf_kelayakan(i);
    c = fmaxMin(layak.rendah, rendah, layak.tinggi, tinggi);
    sa += i*c;
    sb += c;
}
var mm = sa/sb;

console.log( 'layak rendah : ' + rendah );
console.log( 'layak tinggi : ' + tinggi );
console.log( 'kelayakan mamdani : ' + mm );

//defuzz singleton sugeno
layak = mf_kelayakan_singleton();
var ss = (layak.rendah*rendah) + (layak.tinggi*tinggi);
ss = ss/(rendah+tinggi);
console.log( 'kelayakan singleton sugeno : ' + ss );

var str = '<hr>';
str += '<h1>Hasil: ';

str += '</h1>';
str += alDiv( 'info', 'kelayakan mamdani : ' + mm );
str += alDiv( 'warning', 'kelayakan sugeno singleton : ' + ss );

$('#divOut').hide();
$('#divOut').html(str);
$('#divOut').slideDown('slow');

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}

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$(document).ready( function() {
    console.log('ready');
    $('#btnProses').click( klik_proses );
});

```

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//-->
</script>

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</body>
</html>

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