APPENDIX 1

SAMPLE CODING FOR WEB BASED SCRAP INVENTORY OPTIMIZATION USING GENETIC ALGORITHM

========Coding For Chromosome Representation ==============

    Dim con As New ADODB.Connection
    Dim rs As New ADODB.Recordset
    Dim rs1 As New ADODB.Recordset
    Dim rs2 As New ADODB.Recordset
    Dim rs3 As New ADODB.Recordset
    Dim rs4 As New ADODB.Recordset
    Dim rs5 As New ADODB.Recordset
    Dim rs6 As New ADODB.Recordset
    Private Sub Command1_Click()
        Set rs6 = con.Execute("select * from ArticleMaster where Artid = " & Text1.Text & "")
        While Not rs6.EOF
            Text15.Text = rs6(6)
            rs6.MoveNext
        Wend
        Set rs = con.Execute("select * from GAStockFactory where Artid = " & Text1.Text & " and week = 52")
        While Not rs.EOF
            Text2.Text = rs(1)
            rs.MoveNext
        Wend
Set rs1 = con.Execute("select * from GAStockFactory where Artid = " & Text1.Text & " and week = 51")
    While Not rs1.EOF
        Text5.Text = rs1(1)
        rs1.MoveNext
        Wend
    Set rs2 = con.Execute("select * from GAStockDC1 where Artid = " & Text1.Text & " and week = 52")
    While Not rs2.EOF
        Text3.Text = rs2(1)
        rs2.MoveNext
        Wend
    Set rs3 = con.Execute("select * from GAStockDC1 where Artid = " & Text1.Text & " and week = 51")
    While Not rs3.EOF
        Text6.Text = rs3(1)
        rs3.MoveNext
        Wend
    Set rs4 = con.Execute("select * from GAStockDC2 where Artid = " & Text1.Text & " and week = 52")
    While Not rs4.EOF
        Text4.Text = rs4(1)
        rs4.MoveNext
        Wend
    Set rs5 = con.Execute("select * from GAStockDC2 where Artid = " & Text1.Text & " and week = 51")
    While Not rs5.EOF
        Text7.Text = rs5(1)
        rs5.MoveNext
        Wend
End Sub

Private Sub Command4_Click()
    Form8.Width = 12795
    val1 = Text2.Text
    val2 = val1 - 10
    val3 = val1 + 10
    cnt = 0
    Set rs = con.Execute("select * from GAStockFactory where Artid = " & Text1.Text & " and stock between " & val2 & " and " & val3 & ")
    While Not rs.EOF
        cnt = cnt + 1
        rs.MoveNext
    Wend
    Text10.Text = cnt
    val4 = Text3.Text
    val5 = val4 - 10
    val6 = val4 + 10
    cnt1 = 0
    Set rs1 = con.Execute("select * from GAStockDC1 where Artid = " & Text1.Text & " and stock between " & val5 & " and " & val6 & ")
    While Not rs1.EOF
        cnt1 = cnt1 + 1
        rs1.MoveNext
    Wend
    Text9.Text = cnt1
    val7 = Text4.Text
    val8 = val7 - 10
    val9 = val7 + 10
    cnt2 = 0
Set rs2 = con.Execute("select * from GAStockDC2 where Artid = " & Text1.Text & " and stock between " & val8 & " and " & val9 & ")

While Not rs2.EOF
    cnt2 = cnt2 + 1
    rs2.MoveNext
Wend

Text8.Text = cnt2

Text13.Text = (cnt + cnt1 + cnt2) / 3

NC = Text13.Text

Dim xx As Double

xx = (Log((52 - NC) / 52)) / Log(10)

Text12.Text = xx

K = Text12.Text

R1 = 0

R2 = -0.5

R3 = -1

If K >= R2 Then

Text14.Text = Text15.Text - 10

'Set rs2 = con.Execute("update ArticleMaster set ROL = " & Text14.Text & " where Artid = " & Text1.Text & ")

ElseIf K < R2 And K >= R3 Then

Text14.Text = Text15.Text + 10

'Set rs3 = con.Execute("update ArticleMaster set ROL = " & Text14.Text & " where Artid = " & Text1.Text & ")

End If

End Sub

Private Sub Form_Load()

Form8.Width = 6300

con.Open "filedsn=scmdsn"
End Sub

Private Sub Form_Unload(Cancel As Integer)
    con.Close
End Sub

========= Coding For Cross Over Process ====================
Private Sub Command1_Click()
    Set rs6 = con.Execute("select * from ArticleMaster where Artid = " & Text1.Text & ")
    While Not rs6.EOF
        Text15.Text = rs6(6)
        rs6.MoveNext
    Wend
    Set rs = con.Execute("select * from GAStockFactory where Artid = " & Text1.Text & " and week = 52")
    While Not rs.EOF
        Text2.Text = rs(1)
        rs.MoveNext
    Wend
    Set rs1 = con.Execute("select * from GAStockFactory where Artid = " & Text1.Text & " and week = 51")
    While Not rs1.EOF
        Text5.Text = rs1(1)
        rs1.MoveNext
    Wend
    Set rs2 = con.Execute("select * from GAStockDC1 where Artid = " & Text1.Text & " and week = 51")
    While Not rs2.EOF
Text3.Text = rs2(1)
rs2.MoveNext
Wend
Set rs3 = con.Execute("select * from GAStockDC1 where Artid = " & Text1.Text & " and week = 52")
While Not rs3.EOF
Text6.Text = rs3(1)
rs3.MoveNext
Wend
Set rs4 = con.Execute("select * from GAStockDC2 where Artid = " & Text1.Text & " and week = 51")
While Not rs4.EOF
Text4.Text = rs4(1)
rs4.MoveNext
Wend
Set rs5 = con.Execute("select * from GAStockDC2 where Artid = " & Text1.Text & " and week = 52")
While Not rs5.EOF
Text7.Text = rs5(1)
rs5.MoveNext
Wend
End Sub
Private Sub Command4_Click()
Form9.Width = 12795
val1 = Text2.Text
val2 = val1 - 10
val3 = val1 + 10
cnt = 0
Set rs = con.Execute("select * from GASTockFactory where Artid = " & Text1.Text & " and stock between " & val2 & " and " & val3 & "]")
While Not rs.EOF
  cnt = cnt + 1
  rs.MoveNext
  Wend
Text10.Text = cnt

val4 = Text3.Text
val5 = val4 - 10
val6 = val4 + 10
cnt1 = 0
Set rs1 = con.Execute("select * from GAStockDC1 where Artid = " & Text1.Text & " and stock between " & val5 & " and " & val6 & ")
While Not rs1.EOF
  cnt1 = cnt1 + 1
  rs1.MoveNext
  Wend
Text9.Text = cnt1
val7 = Text4.Text
val8 = val7 - 10
val9 = val7 + 10
cnt2 = 0
Set rs2 = con.Execute("select * from GAStockDC2 where Artid = " & Text1.Text & " and stock between " & val8 & " and " & val9 & ")
While Not rs2.EOF
  cnt2 = cnt2 + 1
  rs2.MoveNext
  Wend
Text8.Text = cnt2

Text13.Text = (cnt + cnt1 + cnt2) / 3
NC = Text13.Text

Dim xx1 As Double

xx1 = (Log((52 - NC) / 52)) / Log(10)

Text12.Text = xx1

K = Text12.Text

R1 = 0

R2 = -0.5

R3 = -1

If K >= R2 Then

Text14.Text = Text15.Text - 10

' Set rs2 = con.Execute("update ArticleMaster set ROL = " & Text14.Text & " where Artid = " & Text1.Text & ")

ElseIf K < R2 And K >= R3 Then

Text14.Text = Text15.Text + 10

' Set rs3 = con.Execute("update ArticleMaster set ROL = " & Text14.Text & " where Artid = " & Text1.Text & ")

End If

End Sub

========== Coding For Mutation ================

Private Sub Command1_Click()

Set rs6 = con.Execute("select * from ArticleMaster where Artid = " & Text1.Text & "")

While Not rs6.EOF

Text15.Text = rs6(6)

rs6.MoveNext

Wend

Set rs = con.Execute("select * from GAStockFactory where Artid = " & Text1.Text & " and week = 52")
While Not rs.EOF
Text2.Text = rs(1)
rs.MoveNext
Wend

Set rs2 = con.Execute("select * from GAStockDC2 where Artid = " & Text1.Text & " and week = 51")
While Not rs2.EOF
Text3.Text = rs2(1)
rs2.MoveNext
Wend

Set rs4 = con.Execute("select * from GAStockDC1 where Artid = " & Text1.Text & " and week = 51")
While Not rs4.EOF
Text4.Text = rs4(1)
rs4.MoveNext
Wend

End Sub

Private Sub Command4_Click()
Form10.Width = 12795
val1 = Text2.Text
val2 = val1 - 10
val3 = val1 + 10
cnt = 0
Set rs = con.Execute("select * from GAStockFactory where Artid = " & Text1.Text & " and stock between " & val2 & " and " & val3 & ")

While Not rs.EOF
cnt = cnt + 1
rs.MoveNext
Wend
Text10.Text = cnt

val4 = Text3.Text
val5 = val4 - 10
val6 = val4 + 10
cnt1 = 0
Set rs1 = con.Execute("select * from GAStockDC1 where Artid = " & Text1.Text & " and stock between " & val5 & " and " & val6 & ")
While Not rs1.EOF
    cnt1 = cnt1 + 1
    rs1.MoveNext
Wend
Text9.Text = cnt1

val7 = Text4.Text
val8 = val7 - 10
val9 = val7 + 10
cnt2 = 0
Set rs2 = con.Execute("select * from GAStockDC2 where Artid = " & Text1.Text & " and stock between " & val8 & " and " & val9 & ")
While Not rs2.EOF
    cnt2 = cnt2 + 1
    rs2.MoveNext
Wend
Text8.Text = cnt2

Text13.Text = (cnt + cnt1 + cnt2) / 3
NC = Text13.Text
Dim xx2 As Double
xx2 = (Log((52 - NC) / 52)) / Log(10)
Text12.Text = xx2
K = Text12.Text
R1 = 0
R2 = -0.5
R3 = -1
If K >= R2 Then
Text14.Text = Text15.Text - 10
ElseIf K < R2 And K >= R3 Then
Text14.Text = Text15.Text + 10
End If
End Sub
function [TS] = algpcmax(T, prob, No_Proc)
% ALGPCMAX computes schedule for 'P||Cmax' problem
%
% Synopsis
% TS = algpcmax(T, problem, No_Proc)
%
% Description
% TS = algpcmax(T, problem, No_Proc) finds schedule of scheduling problem 'P||Cmax'.
% Parameters:
% T: input set of tasks
% TS: set of tasks with a schedule
% PROBLEM:description of scheduling problem (object PROBLEM) - 'P||Cmax',
% No_Proc:number of processors for scheduling
% m = No_Proc;
% n = size(T);

if ~(is(prob,'alpha','P') && is(prob,'betha','') && is(prob,'gamma','Cmax') && (m > 0))
    error('This problem can\'t be solved by this algorithm or number of processors is smaller than zero');
end
% matrix A

prosesses = eye(n);
for i=2:m
    prosesses = [prosesses, eye(n)];
end

row2 = [T.ProcTime(:)',zeros(1,2*n)];

processors(1,:) = row2;
for i=1:n
    for u=1:length(row2)
        processors(i+1,u+(i*n)) = row2(1,u);
    end
end

c_max_column = [zeros(n,1);-1*ones(m,1)];

A = [prosesses;processors(1:m,1:n*m)];
A = [A,c_max_column];

% vector b
b = [ones(n,1);zeros(m,1)];

% vector c

c = [zeros(m*n,1);1];

% CType
ctype = 'E';
for i=2:n
    ctype = [ctype;'E'];
end
end
for i=n+1:n+m
    ctype = [ctype;'L'];
end

%lower bound of variables
lb = [zeros(m*n,1);ceil(sum(T.ProcTime)/m)];

%upper bound of variables
ub = [ones(m*n,1);sum(T.ProcTime)];

% VARTYPE   %Type of variable 'C'=contious, 'I'=integer
vartype = 'I';
for i=2:m*n+1
    vartype = [vartype;'I'];
end

schoptions=schoptionsset('ilpSolver','glpk','solverVerbosity',0);

sense=1;

[xmin,fmin,status,extra] = ilinprog
(schoptions,sense,c,A,b,ctype,lb,ub,vartype);

if(status==1)
    C_max = xmin(m*n+1);
else
    disp('Problem.');
    return
end;
t_proc = zeros(1,m);
s = inf*ones(1,n); % start of executing tasks
processorSchedule = zeros(1,n); % vector of task assignment to processor

xmin = xmin';

for i=0:m-1
    for u=1:n
        if xmin(i*n+u)==1
            processorSchedule(u) = i+1;
            s(u) = t_proc(i+1);
            t_proc(i+1) = t_proc(i+1) + T.ProcTime(u);
        end
    end
end

description = 'Parallel scheduling without preemption';
add_schedule(T,description,s,T.ProcTime,processorSchedule);
TS = T;

% end