!-------------This file is for group decision-making-----;

model:

!-----------Name of experts, citeria, and alternatives------------------;

sets:

Experts/m1 m2 m3 m4 m5 m6 m7 m8 m9 m10 m11 m12 m13 m14 m15 m16 m17 m18 m19 m20 m21 m22 m23 m24 m25 m26 m27 m28 m29 m30 m31 m32 m33 m34 m35 m36 m37 m38 m39 m40 m41 m42 m43 m44 m45 m46 m47 m48 m49 m50 m51 m52 m53 m54 m55 m56 m57 m58 m59 m60 m61 m62 m63 m64 m65 m66 m67 m68 m69 m70 m71 m72 m73 m74 m75 m76 m77 m78 m79 m80 m81 m82 m83 m84 m85 m86 m87 m88 m89 m90 m91 m92 m93 m94 m95 m96 m97 m98 m99 m100 m101 m102 m103 m104 m105 m106 m107 m108 m109 m110 m111 m112/:Experts\_color,W\_Experts;

Criteria/1/:W\_Criteria;

Alternatives/A B C D E F G H I J K L M N O P Q R S T U V/:W\_Alternatives;

Experts\_Criteria(Experts,Criteria):Criteria\_color;

Experts\_Criteria\_Alternatives(Experts,Criteria,Alternatives):Alternatives\_color,W;

Experts\_Alternatives(Experts,Alternatives);

Criteria\_Alternatives(Criteria,Alternatives);

endsets

!-------The input ranks of experts, criteria and alternatives-----------;

data:

Experts\_color= 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112;

Criteria\_color= 1;

Alternatives\_color= 4 5 3 14 22 12 19 9 18 17 15 16 2 11 7 10 20 8 6 13 1 21

4 5 3 14 22 10 19 9 18 17 15 16 2 12 7 13 21 8 6 11 1 20

1 2 8 9 11 12 13 14 6 5 3 4 15 16 7 17 18 19 20 21 10 22

20 13 7 14 15 17 18 3 19 4 2 5 8 1 6 9 10 21 16 22 12 11

10 15 21 6 4 17 2 7 14 12 22 9 3 20 11 5 8 18 19 1 16 13

1 2 14 19 18 3 13 4 15 21 20 22 8 5 6 7 16 9 12 17 11 10

2 3 21 12 11 4 13 19 14 17 7 22 16 9 20 6 1 5 10 15 8 18

10 11 13 9 14 5 15 4 16 17 18 19 7 2 8 6 20 12 1 21 3 22

2 7 8 9 22 10 11 5 21 13 15 14 6 1 16 12 18 17 4 19 3 20

3 5 4 12 15 13 20 9 19 18 16 17 2 11 7 10 22 8 6 14 1 21

4 5 3 14 21 12 20 9 18 17 15 16 1 11 7 10 22 8 6 13 2 19

11 10 13 9 21 15 22 4 16 17 7 12 5 2 18 1 14 8 6 19 3 20

13 14 6 16 22 7 15 11 8 20 21 10 1 12 3 4 19 2 9 17 5 18

1 2 5 3 4 12 15 17 16 6 18 11 19 10 9 20 13 21 7 22 8 14

15 9 21 18 16 5 19 8 14 12 10 7 6 11 3 1 22 13 17 4 2 20

1 3 6 13 20 2 8 18 16 19 11 14 17 15 9 7 21 5 22 12 4 10

17 9 10 8 2 16 7 13 22 15 11 14 18 20 3 19 12 6 21 4 1 5

5 3 4 14 21 11 18 9 17 16 13 15 2 22 7 10 20 8 6 12 1 19

8 20 11 10 9 14 12 4 13 22 6 17 16 1 15 7 3 19 2 21 5 18

10 4 3 11 12 13 14 15 7 1 22 20 16 2 17 5 18 6 19 21 9 8

3 18 7 6 13 14 10 8 16 11 9 12 2 17 22 15 20 4 1 21 5 19

11 4 1 12 19 16 9 5 17 20 21 7 13 15 3 10 6 22 2 14 8 18

20 17 2 16 11 12 8 9 1 4 7 18 15 13 3 10 19 21 5 6 14 22

21 20 9 15 13 18 19 7 2 11 3 5 6 14 4 12 17 16 1 22 10 8

9 3 4 8 22 16 19 11 18 15 14 17 7 1 2 10 12 6 20 13 5 21

1 1 8 9 17 11 7 6 15 3 2 16 18 10 14 19 13 20 4 21 12 22

2 9 8 22 6 7 10 3 11 12 5 4 13 1 14 15 16 19 17 20 18 21

2 13 14 22 16 19 3 18 4 21 10 12 11 9 5 1 7 8 6 17 20 15

22 8 10 11 14 2 6 9 13 15 16 19 1 5 7 4 12 17 3 21 18 20

14 12 13 6 15 16 17 5 18 7 11 19 4 1 8 2 20 9 10 21 3 22

14 15 16 7 22 13 17 4 10 11 6 18 5 2 19 8 20 9 3 12 1 21

4 5 3 14 22 12 19 9 18 17 15 16 2 11 7 10 21 8 6 13 1 20

12 13 14 6 18 15 20 7 16 11 10 17 4 3 8 5 19 1 9 22 2 21

4 5 3 14 22 12 19 8 18 17 15 16 2 10 7 9 21 11 6 13 1 20

3 5 4 13 22 12 20 9 18 17 15 16 2 11 7 10 21 8 6 14 1 19

6 10 3 5 2 11 12 4 7 8 1 9 14 13 15 22 16 17 18 19 20 21

2 1 9 4 11 10 18 5 7 13 15 16 17 6 3 12 8 19 20 14 22 21

12 1 11 2 5 13 3 21 17 15 9 4 6 7 8 10 14 16 19 20 18 22

22 20 5 6 17 19 4 3 13 7 12 15 16 1 8 10 2 11 9 14 18 21

3 4 5 19 14 9 15 20 1 7 17 16 11 6 13 18 8 21 2 10 22 12

17 10 12 9 18 3 22 21 1 13 4 14 2 7 6 8 19 11 5 15 16 20

2 10 12 1 22 11 20 14 16 17 18 19 7 3 4 5 6 8 15 13 9 21

11 17 9 4 2 7 8 6 21 14 1 3 16 12 20 19 22 5 10 18 13 15

14 19 3 21 11 13 16 1 2 10 4 12 17 7 15 22 18 6 8 20 9 5

3 5 4 14 22 12 19 8 18 17 16 15 2 11 9 10 21 7 6 13 1 20

6 12 5 13 22 14 15 7 16 17 9 18 4 3 10 8 19 11 2 20 1 21

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2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 1 22

12 10 14 11 15 16 17 6 22 18 9 13 3 5 8 7 19 4 2 20 1 21

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5 16 17 10 6 1 19 7 11 20 4 22 12 8 3 2 13 9 21 15 14 18

16 7 2 1 22 11 4 17 18 9 15 14 12 13 19 10 8 6 3 20 5 21

20 9 13 16 18 19 10 4 7 1 2 3 5 6 22 21 15 11 8 17 12 14

12 5 6 7 22 19 9 17 3 1 13 14 11 8 16 20 15 4 21 2 18 10

19 4 8 18 1 15 20 9 7 3 2 10 12 5 14 22 17 21 11 13 6 16

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17 19 18 21 1 20 10 2 5 3 4 7 14 12 8 9 13 15 11 22 16 6

4 5 3 14 22 11 19 8 18 15 16 17 2 10 9 13 21 7 6 12 1 20

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1 4 7 8 5 9 10 2 11 6 12 13 14 3 15 16 17 18 19 20 21 22

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4 2 10 12 18 3 13 9 21 22 1 20 8 7 15 16 17 6 14 11 5 19

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12 13 14 9 20 15 16 5 17 11 7 18 2 4 10 6 19 8 3 21 1 22

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1 22 21 6 16 13 2 8 4 3 17 9 5 18 7 11 20 12 10 19 14 15

1 4 9 2 20 10 3 14 19 22 16 15 5 11 17 18 21 12 8 6 7 13

5 22 6 4 8 9 10 1 11 7 12 13 14 2 15 16 17 3 18 19 20 21

4 5 3 14 22 12 19 8 18 17 15 16 2 11 7 10 21 9 6 13 1 20

5 4 3 12 22 11 18 8 17 16 14 15 2 10 20 9 21 7 6 13 1 19

4 5 3 18 22 10 16 9 15 14 12 13 2 11 7 19 20 8 6 21 1 17

10 11 12 13 14 15 16 4 17 5 8 9 1 2 18 7 19 20 6 21 3 22

4 5 3 14 22 12 20 9 18 17 15 16 1 11 7 10 19 8 6 13 2 21

5 6 9 11 18 13 14 4 21 15 16 22 7 8 12 10 19 1 3 17 2 20

10 11 12 4 19 13 21 7 14 15 6 16 1 9 17 5 18 8 3 20 2 22

21 20 8 22 14 16 19 9 10 13 12 11 1 2 4 5 18 6 3 17 7 15

7 6 4 12 18 15 19 13 8 20 14 3 2 10 1 22 17 11 9 21 5 16

7 11 1 14 4 22 8 16 10 19 17 2 3 6 15 5 18 13 21 12 20 9

1 11 21 12 22 17 6 7 19 16 20 18 13 8 14 4 3 5 9 15 10 2

1 2 10 5 18 6 13 19 17 22 21 20 4 9 16 15 12 7 3 11 8 14

3 9 22 11 6 10 16 2 17 8 21 1 15 12 19 20 5 4 17 7 18 13

3 19 18 17 21 7 12 2 9 20 11 10 14 16 4 22 8 13 1 15 6 5

13 16 17 1 21 18 19 6 9 14 10 7 5 4 12 11 20 8 3 15 2 22

10 13 14 9 18 15 22 8 21 12 7 16 1 6 5 4 17 11 3 20 2 19

4 7 6 8 9 10 11 12 13 14 15 16 3 1 5 17 18 19 20 21 2 22

13 21 1 3 4 11 19 15 7 16 12 20 14 22 5 17 8 6 2 18 10 9

16 22 17 18 21 15 19 5 3 4 1 2 7 6 11 12 8 9 10 20 14 13

12 9 19 14 22 1 3 16 10 21 15 4 5 13 11 6 20 17 2 8 18 7

14 9 3 2 19 10 20 7 15 16 8 17 4 6 12 11 18 5 13 21 1 22

11 6 8 9 13 10 12 1 14 2 3 4 15 16 17 18 19 20 5 21 7 22

2 3 5 6 9 11 12 1 7 14 16 17 19 20 10 8 21 22 15 13 4 18

4 5 3 14 22 12 18 9 19 17 15 16 2 11 7 10 21 8 6 13 1 20

2 14 7 6 20 18 16 22 3 19 12 5 13 21 11 17 15 10 4 8 1 9

6 22 17 12 18 16 13 1 5 3 2 14 20 4 8 7 10 15 9 21 19 11;

enddata

!----------------------------Objective Function--------------------------;

MAX=Z;

!----------------------------Constraints 1 & 2 in OPA---------------------;

@FOR(Experts\_Criteria(Ex,Cr): @for(Alternatives(r)|r#ne#**22**:Experts\_color(Ex)\*Criteria\_color(Ex,Cr)\*r\*(W(Ex,Cr,Alternatives\_color(Ex,Cr,r))-W(Ex,Cr,(Alternatives\_color(Ex,Cr,r+1))))>=Z));

@FOR(Experts\_Criteria(Ex,Cr): @for(Alternatives(r)|r#eq#**22**:Experts\_color(Ex)\*Criteria\_color(Ex,Cr)\*r\*(W(Ex,Cr,Alternatives\_color(Ex,Cr,r)))>=Z));

!----------------------------Constraint 3 in OPA--------------------------;

@sum(Experts\_Criteria\_Alternatives(Ex,Cr,r):W(Ex,Cr,r))=1;

!----------------------------Last constraint in OPA-----------------------;

@free(Z);

!------Calculating the weights of experts, criteria and alternatives -----;

@FOR(Experts(Ex):

@sum(Criteria\_Alternatives(Cr,r):W(Ex,Cr,r))=W\_Experts(Ex));

@FOR(Criteria(Cr) :

@sum(Experts\_Alternatives(Ex,r) :W(Ex,Cr,r))=W\_Criteria(Cr));

@FOR(Alternatives(r) :

@sum(Experts\_Criteria(Ex,Cr):W(Ex,Cr,Alternatives\_color(Ex,Cr,Alternatives\_color(Ex,Cr,r))))=W\_Alternatives(r));

end