Task 14 – Alternate User Selection Based on Generation Number

This task seeks to add variation while letting the user take a break from ranking music samples. The user now ranks music samples every **user-interaction-g** generations. I also moved all of the genetic algorithm configuration variables to one spot in the code for ease of access.

Demo

```
 [2]> ( ga )


Generation 0 population ...

1     #<MUSIC #x1AB3B4E1>  0.0
2     #<MUSIC #x1AB3B9F1>  0.0
3     #<MUSIC #x1AB3BC6D>  0.0
4     #<MUSIC #x1AB3BE99>  0.0
5     #<MUSIC #x1AB3CC91>  0.0
6     #<MUSIC #x1AB3D06D>  0.0
7     #<MUSIC #x1AB3D1F9>  0.0
8     #<MUSIC #x1AB3D3FD>  0.0
9     #<MUSIC #x1AB3D651>  0.0
10    #<MUSIC #x1AB3D765>  0.0
11    #<MUSIC #x1AB3D6F1>  0.0
12    #<MUSIC #x1AB3D8F5>  0.0
13    #<MUSIC #x1AB3DB49>  0.0
14    #<MUSIC #x1AB3DE3D>  0.0
15    #<MUSIC #x1AB3E041>  0.0
16    #<MUSIC #x1AB3E1CD>  0.0
17    #<MUSIC #x1AB3E381>  0.0
18    #<MUSIC #x1AB3E5D5>  0.0
19    #<MUSIC #x1AB3E789>  0.0
20    #<MUSIC #x1AB3E8ED>  0.0
21    #<MUSIC #x1AB3EAA1>  0.0
22    #<MUSIC #x1AB3ECF5>  0.0
23    #<MUSIC #x1AB3EF49>  0.0
24    #<MUSIC #x1AB3F0AD>  0.0
25    #<MUSIC #x1AB3F30D>  0.0
```

```
----------------Selection----------------
X:1
T:Selection
C:Dystopian Tuesday
M:4/4
L:1/4
Q:1/4=120
V:S clef=treble name=Melody1 snm=Melody1
V:A clef=treble name=Melody2 snm=Melody2
%%score [ ( S ) ( A ) ]
K:C
%%MIDI program 0
V:S
D B C/2 A/2 D D G2 C z4 |]
V:A
A2 B2 E2 E2 z4 |]
V:S
A2 E C G2 A2 z4 |]
V:A
F/2' G' E2' G/2' C' F/2' E' F/2' C' z4 |]
V:S
D G/2 D/2 F2 G/2 E C2 B/2 z4 |]
V:A
F B/2 F/2 A2 B/2 G E2 F/2 z4 |]
[Sample 0] Melody 1 ranking (out of 10)? 3
Melody 2 ranking (out of 10)? 5

[Sample 1] Melody 1 ranking (out of 10)? 4
Melody 2 ranking (out of 10)? 7

[Sample 2] Melody 1 ranking (out of 10)? 4
Melody 2 ranking (out of 10)? 1

average fitness of population 1 = 1.58


Generation 1 population ...

1     #<MUSIC #x1AB41B09>  0.0
2     #<MUSIC #x1AB41B39>  5.0
3     #<MUSIC #x1AB41B75>  5.0
```

```
4     #<MUSIC #x1AB42D09>  0.0
5     #<MUSIC #x1AB42D65>  2.5
6     #<MUSIC #x1AB42D95>  0.0
7     #<MUSIC #x1AB42DD1>  0.0
8     #<MUSIC #x1AB42E2D>  5.5
9     #<MUSIC #x1AB42E51>  0.0
10    #<MUSIC #x1AB42E8D>  0.0
11    #<MUSIC #x1AB42EC9>  0.0
12    #<MUSIC #x1AB42F05>  0.0
13    #<MUSIC #x1AB42F29>  0.0
14    #<MUSIC #x1AB42F79>  4.0
15    #<MUSIC #x1AB42FBD>  5.5
16    #<MUSIC #x1AB42FE1>  0.0
17    #<MUSIC #x1AB43025>  5.5
18    #<MUSIC #x1AB43069>  2.5
19    #<MUSIC #x1AB430A5>  0.0
20    #<MUSIC #x1AB430E1>  0.0
21    #<MUSIC #x1AB43105>  0.0
22    #<MUSIC #x1AB43129>  0.0
23    #<MUSIC #x1AB43185>  4.0
24    #<MUSIC #x1AB431A9>  0.0
25    #<MUSIC #x1AB431F1>  0.0
26    #<MUSIC #x1AB43215>  0.0

average fitness of population 2 = 3.21


Generation 2 population ...

1     #<MUSIC #x1AB437BD>  5.0
2     #<MUSIC #x1AB437E1>  5.5
3     #<MUSIC #x1AB43805>  5.5
4     #<MUSIC #x1AB43B15>  2.5
5     #<MUSIC #x1AB43B59>  2.5
6     #<MUSIC #x1AB43B9D>  3.75
7     #<MUSIC #x1AB43BE1>  2.75
8     #<MUSIC #x1AB43C1D>  0.0
9     #<MUSIC #x1AB43C41>  0.0
10    #<MUSIC #x1AB43CAD>  4.5
11    #<MUSIC #x1AB43CDD>  4.0
12    #<MUSIC #x1AB43D39>  2.75
```

```
13    #<MUSIC #x1AB43DA5>  3.25
14    #<MUSIC #x1AB43DC9>  0.0
15    #<MUSIC #x1AB43E0D>  5.25
16    #<MUSIC #x1AB43E31>  0.0
17    #<MUSIC #x1AB43E81>  2.75
18    #<MUSIC #x1AB43EDD>  5.5
19    #<MUSIC #x1AB43F19>  0.0
20    #<MUSIC #x1AB43F5D>  2.75
21    #<MUSIC #x1AB43FB9>  2.5
22    #<MUSIC #x1AB43FFD>  4.75
23    #<MUSIC #x1AB44059>  5.25
24    #<MUSIC #x1AB440B5>  2.75
25    #<MUSIC #x1AB4411D>  4.75
26    #<MUSIC #x1AB7D149>  2.0

average fitness of population 3 = 3.815


Generation 3 population ...

1     #<MUSIC #x1AB43029>  2.75
2     #<MUSIC #x1AB4304D>  5.5
3     #<MUSIC #x1AB43071>  4.5
4     #<MUSIC #x1AB43381>  2.5
5     #<MUSIC #x1AB433A5>  0.0
6     #<MUSIC #x1AB43411>  4.125
7     #<MUSIC #x1AB43455>  5.25
8     #<MUSIC #x1AB43499>  4.625
9     #<MUSIC #x1AB434ED>  5.75
10    #<MUSIC #x1AB43549>  3.75
11    #<MUSIC #x1AB43599>  4.75
12    #<MUSIC #x1AB435F9>  1.375
13    #<MUSIC #x1AB43655>  5.25
14    #<MUSIC #x1AB436A9>  4.125
15    #<MUSIC #x1AB436ED>  1.25
16    #<MUSIC #x1AB43731>  5.0
17    #<MUSIC #x1AB43755>  4.0
18    #<MUSIC #x1AB437B1>  5.5
19    #<MUSIC #x1AB437F5>  4.5
20    #<MUSIC #x1AB43855>  1.625
21    #<MUSIC #x1AB438C1>  4.375
```

```
22    #<MUSIC #x1AB43929>  2.875
23    #<MUSIC #x1AB4394D>  4.0
24    #<MUSIC #x1AB43991>  1.25
25    #<MUSIC #x1AB439D5>  2.75
26    #<MUSIC #x1AB6A759>  4.0

----------------Selection----------------
X:1
T:Selection
C:Dystopian Tuesday
M:4/4
L:1/4
Q:1/4=120
V:S clef=treble name=Melody1 snm=Melody1
V:A clef=treble name=Melody2 snm=Melody2
%%score [ ( S ) ( A ) ]
K:C
%%MIDI program 0
V:S
F/2 G/2 B2' B' E' z4 |]
V:A
B' D2' E2' G/2' E/2' A2' A/2' z4 |]
V:S
F/2 G/2 B2' B' E' z4 |]
V:A
B' D2' E2' G/2' E/2' A2' A/2' z4 |]
V:S
F/2 E C G2 A2 z4 |]
V:A
B' D2' E2' G/2' E/2' A2' z4 |]
[Sample 0] Melody 1 ranking (out of 10)? 2
Melody 2 ranking (out of 10)? 2

[Sample 1] Melody 1 ranking (out of 10)? 0
Melody 2 ranking (out of 10)? 0

[Sample 2] Melody 1 ranking (out of 10)? 4
Melody 2 ranking (out of 10)? 5

average fitness of population 4 = 4.97
```

```
Generation 4 population ...

1     #<MUSIC #x1AB42BF5>  2.875
2     #<MUSIC #x1AB42C19>  5.75
3     #<MUSIC #x1AB42C49>  5.25
4     #<MUSIC #x1AB42F69>  5.0625
5     #<MUSIC #x1AB42FC9>  4.375
6     #<MUSIC #x1AB4301D>  5.25
7     #<MUSIC #x1AB43071>  4.0625
8     #<MUSIC #x1AB430C5>  4.125
9     #<MUSIC #x1AB43119>  4.25
10    #<MUSIC #x1AB43185>  5.1875
11    #<MUSIC #x1AB431D9>  4.75
12    #<MUSIC #x1AB43239>  5.375
13    #<MUSIC #x1AB43295>  5.5
14    #<MUSIC #x1AB432E9>  5.625
15    #<MUSIC #x1AB43345>  2.875
16    #<MUSIC #x1AB43399>  4.4375
17    #<MUSIC #x1AB43405>  5.125
18    #<MUSIC #x1AB43471>  6.6875
19    #<MUSIC #x1AB434DD>  4.0625
20    #<MUSIC #x1AB43549>  3.25
21    #<MUSIC #x1AB4358D>  7.0
22    #<MUSIC #x1AB435E1>  5.375
23    #<MUSIC #x1AB43625>  4.9375
24    #<MUSIC #x1AB43669>  5.0
25    #<MUSIC #x1AB436E1>  4.6875
26    #<MUSIC #x1AB6BFF9>  3.375

average fitness of population 5 = 5.56875


Generation 5 population ...

1     #<MUSIC #x1AB429BD>  5.75
2     #<MUSIC #x1AB429E1>  7.0
3     #<MUSIC #x1AB42A05>  5.25
4     #<MUSIC #x1AB42D25>  5.03125
5     #<MUSIC #x1AB42D79>  5.59375
6     #<MUSIC #x1AB42DCD>  6.15625
```

```
7     #<MUSIC #x1AB42E2D>  5.40625
8     #<MUSIC #x1AB42E7D>  4.96875
9     #<MUSIC #x1AB42EC1>  5.5
10    #<MUSIC #x1AB42F15>  4.8125
11    #<MUSIC #x1AB42F81>  6.03125
12    #<MUSIC #x1AB42FED>  4.90625
13    #<MUSIC #x1AB43041>  4.84375
14    #<MUSIC #x1AB43095>  6.46875
15    #<MUSIC #x1AB430F5>  5.5
16    #<MUSIC #x1AB43149>  4.40625
17    #<MUSIC #x1AB431A9>  5.5
18    #<MUSIC #x1AB431FD>  5.15625
19    #<MUSIC #x1AB43269>  5.21875
20    #<MUSIC #x1AB432D5>  4.21875
21    #<MUSIC #x1AB43341>  5.40625
22    #<MUSIC #x1AB433AD>  5.25
23    #<MUSIC #x1AB43419>  4.40625
24    #<MUSIC #x1AB4346D>  5.46875
25    #<MUSIC #x1AB434E5>  5.28125
26    #<MUSIC #x1AB64875>  5.6875

average fitness of population 6 = 5.93875


Generation 6 population ...

1     #<MUSIC #x1AB4289D>  5.40625
2     #<MUSIC #x1AB428CD>  5.75
3     #<MUSIC #x1AB428F1>  6.03125
4     #<MUSIC #x1AB42C11>  5.0625
5     #<MUSIC #x1AB42C65>  5.734375
6     #<MUSIC #x1AB42CB9>  5.34375
7     #<MUSIC #x1AB42D0D>  5.90625
8     #<MUSIC #x1AB42D61>  5.546875
9     #<MUSIC #x1AB42DB5>  5.1875
10    #<MUSIC #x1AB42E09>  5.8125
11    #<MUSIC #x1AB42E75>  5.171875
12    #<MUSIC #x1AB42EC9>  5.890625
13    #<MUSIC #x1AB42F1D>  5.625
14    #<MUSIC #x1AB42F7D>  5.40625
15    #<MUSIC #x1AB42FDD>  5.6875
```

```
16    #<MUSIC #x1AB43049>  6.03125
17    #<MUSIC #x1AB430A9>  5.703125
18    #<MUSIC #x1AB43115>  5.59375
19    #<MUSIC #x1AB43169>  6.265625
20    #<MUSIC #x1AB431BD>  6.0625
21    #<MUSIC #x1AB43229>  6.03125
22    #<MUSIC #x1AB4327D>  5.6875
23    #<MUSIC #x1AB432D1>  6.515625
24    #<MUSIC #x1AB4333D>  5.578125
25    #<MUSIC #x1AB433B5>  5.46875
26    #<MUSIC #x1AB52BB5>  5.96875

----------------Selection----------------
X:1
T:Selection
C:Dystopian Tuesday
M:4/4
L:1/4
Q:1/4=120
V:S clef=treble name=Melody1 snm=Melody1
V:A clef=treble name=Melody2 snm=Melody2
%%score [ ( S ) ( A ) ]
K:C
%%MIDI program 0
V:S
E D/2 C A/2 A/2 B2 E2 B2 z4 |]
V:A
A' F/2' B' E/2' A2' C D2 z4 |]
V:S
F/2 E F G2 A2 G/2 A/2 C2 z4 |]
V:A
A' F/2' B' E/2' B2' G/2 F2 z4 |]
V:S
E D/2 C E E2 D C/2 C/2 z4 |]
V:A
A' F/2' B' E/2' B2' B' E/2' z4 |]
[Sample 0] Melody 1 ranking (out of 10)? 4
Melody 2 ranking (out of 10)? 1

[Sample 1] Melody 1 ranking (out of 10)? 4
Melody 2 ranking (out of 10)? 0
```

```
[Sample 2] Melody 1 ranking (out of 10)? 3
Melody 2 ranking (out of 10)? 0

average fitness of population 7 = 6.3240623


Generation 7 population ...

1     #<MUSIC #x1AB42685>  6.515625
2     #<MUSIC #x1AB426A9>  6.03125
3     #<MUSIC #x1AB426CD>  6.515625
4     #<MUSIC #x1AB429F9>  6.5546875
5     #<MUSIC #x1AB42A59>  6.7578125
6     #<MUSIC #x1AB42AAD>  5.9609375
7     #<MUSIC #x1AB42B01>  6.2734375
8     #<MUSIC #x1AB42B55>  6.1328125
9     #<MUSIC #x1AB42BA9>  6.484375
10    #<MUSIC #x1AB42C09>  6.03125
11    #<MUSIC #x1AB42C5D>  5.78125
12    #<MUSIC #x1AB42CA1>  4.0
13    #<MUSIC #x1AB42D01>  5.890625
14    #<MUSIC #x1AB42D55>  6.2734375
15    #<MUSIC #x1AB42DA9>  6.28125
16    #<MUSIC #x1AB42DFD>  5.71875
17    #<MUSIC #x1AB42E51>  6.3359375
18    #<MUSIC #x1AB42EB1>  6.09375
19    #<MUSIC #x1AB42F05>  5.8046875
20    #<MUSIC #x1AB42F71>  5.859375
21    #<MUSIC #x1AB42FDD>  5.90625
22    #<MUSIC #x1AB4303D>  6.640625
23    #<MUSIC #x1AB4309D>  5.9609375
24    #<MUSIC #x1AB430F1>  6.34375
25    #<MUSIC #x1AB42281>  5.921875
26    #<MUSIC #x1AB422F9>  6.03125

average fitness of population 8 = 6.672656


Generation 8 population ...
```

```
1     #<MUSIC #x1AB424DD>  6.515625
2     #<MUSIC #x1AB42501>  5.890625
3     #<MUSIC #x1AB42531>  6.7578125
4     #<MUSIC #x1AB4285D>  6.640625
5     #<MUSIC #x1AB428C9>  5.984375
6     #<MUSIC #x1AB4291D>  6.6367188
7     #<MUSIC #x1AB42971>  6.5820313
8     #<MUSIC #x1AB429DD>  6.3945313
9     #<MUSIC #x1AB42A49>  6.3710938
10    #<MUSIC #x1AB42AB5>  6.1171875
11    #<MUSIC #x1AB42B09>  6.5546875
12    #<MUSIC #x1AB42B5D>  6.4570313
13    #<MUSIC #x1AB42BB1>  6.2109375
14    #<MUSIC #x1AB42C05>  6.5390625
15    #<MUSIC #x1AB42C71>  6.203125
16    #<MUSIC #x1AB42CC5>  6.3945313
17    #<MUSIC #x1AB42D19>  6.5507813
18    #<MUSIC #x1AB42D6D>  6.2734375
19    #<MUSIC #x1AB42DD9>  6.7382813
20    #<MUSIC #x1AB42E45>  6.4335938
21    #<MUSIC #x1AB42EBD>  6.2109375
22    #<MUSIC #x1AB42F11>  6.6328125
23    #<MUSIC #x1AB42F65>  6.3515625
24    #<MUSIC #x1AB42FB9>  6.2929688
25    #<MUSIC #x1AB4300D>  6.6875
26    #<MUSIC #x1AB60715>  6.3945313

average fitness of population 9 = 6.778047


Generation 9 population ...

1     #<MUSIC #x1AB424B9>  6.640625
2     #<MUSIC #x1AB424DD>  6.6328125
3     #<MUSIC #x1AB4250D>  6.640625
4     #<MUSIC #x1AB4282D>  6.6132813
5     #<MUSIC #x1AB4288D>  6.455078
6     #<MUSIC #x1AB428ED>  6.607422
7     #<MUSIC #x1AB42941>  6.4433594
8     #<MUSIC #x1AB42995>  6.4941406
9     #<MUSIC #x1AB429F5>  6.3828125
```

```
10    #<MUSIC #x1AB42A49>  6.4433594
11    #<MUSIC #x1AB42A9D>  6.7304688
12    #<MUSIC #x1AB42AF1>  6.533203
13    #<MUSIC #x1AB42B45>  6.455078
14    #<MUSIC #x1AB42BA5>  6.5742188
15    #<MUSIC #x1AB42BF9>  6.2851563
16    #<MUSIC #x1AB42C59>  6.3027344
17    #<MUSIC #x1AB42CAD>  6.6835938
18    #<MUSIC #x1AB42D0D>  6.7441406
19    #<MUSIC #x1AB42D6D>  6.3867188
20    #<MUSIC #x1AB42DC1>  6.4589844
21    #<MUSIC #x1AB42E21>  6.6621094
22    #<MUSIC #x1AB42E8D>  6.5058594
23    #<MUSIC #x1AB42EE1>  6.6503906
24    #<MUSIC #x1AB42F35>  6.171875
25    #<MUSIC #x1AB42FAD>  6.3945313
26    #<MUSIC #x1AB4B2B5>  6.5585938

----------------Selection----------------
X:1
T:Selection
C:Dystopian Tuesday
M:4/4
L:1/4
Q:1/4=120
V:S clef=treble name=Melody1 snm=Melody1
V:A clef=treble name=Melody2 snm=Melody2
%%score [ ( S ) ( A ) ]
K:C
%%MIDI program 0
V:S
A2 B B/2 C G/2 A/2 B z4 |]
V:A
C' A2' F' C/2' C/2' B2' z4 |]
V:S
A2 B B/2 C G/2 D E2 C E z4 |]
V:A
C' A2' F' C/2' C/2' B2' z4 |]
V:S
A2 B B/2 C G/2 D E2 C E z4 |]
V:A
```

```
C' A2' F' C/2' C/2' F2 C z4 |]
[Sample 0] Melody 1 ranking (out of 10)? 3
Melody 2 ranking (out of 10)? 2

[Sample 1] Melody 1 ranking (out of 10)? 2
Melody 2 ranking (out of 10)? 4

[Sample 2] Melody 1 ranking (out of 10)? 1
Melody 2 ranking (out of 10)? 0

average fitness of population 10 = 6.871758


Generation 10 population ...

1     #<MUSIC #x1AB42385>  6.640625
2     #<MUSIC #x1AB423A9>  6.7304688
3     #<MUSIC #x1AB423CD>  6.3828125
4     #<MUSIC #x1AB426ED>  6.9208984
5     #<MUSIC #x1AB42759>  6.895508
6     #<MUSIC #x1AB427AD>  6.623047
7     #<MUSIC #x1AB42801>  6.564453
8     #<MUSIC #x1AB42855>  6.463867
9     #<MUSIC #x1AB428A9>  6.580078
10    #<MUSIC #x1AB428FD>  6.6884766
11    #<MUSIC #x1AB42951>  6.6123047
12    #<MUSIC #x1AB429A5>  6.9472656
13    #<MUSIC #x1AB42A05>  6.5478516
14    #<MUSIC #x1AB42A59>  6.631836
15    #<MUSIC #x1AB42AB9>  6.4433594
16    #<MUSIC #x1AB42B09>  6.689453
17    #<MUSIC #x1AB42B75>  6.5996094
18    #<MUSIC #x1AB42BC9>  6.6640625
19    #<MUSIC #x1AB42C29>  6.6416016
20    #<MUSIC #x1AB42C89>  6.3828125
21    #<MUSIC #x1AB42049>  6.6035156
22    #<MUSIC #x1AB4209D>  6.383789
23    #<MUSIC #x1AB420F1>  6.638672
24    #<MUSIC #x1AB42145>  6.5429688
25    #<MUSIC #x1AB421BD>  6.727539
26    #<MUSIC #x1AB42211>  6.2470703
```

```
average fitness of population 11 = 7.0160155


Generation 11 population ...

1     #<MUSIC #x1AB42425>  6.9472656
2     #<MUSIC #x1AB42449>  6.6884766
3     #<MUSIC #x1AB4246D>  6.7304688
4     #<MUSIC #x1AB427A5>  7.0092773
5     #<MUSIC #x1AB427F9>  6.9213867
6     #<MUSIC #x1AB4284D>  6.524414
7     #<MUSIC #x1AB428AD>  6.9521484
8     #<MUSIC #x1AB42919>  6.7070313
9     #<MUSIC #x1AB4296D>  6.663574
10    #<MUSIC #x1AB429C1>  6.6342773
11    #<MUSIC #x1AB42A15>  6.6367188
12    #<MUSIC #x1AB42A69>  7.04541
13    #<MUSIC #x1AB42ABD>  6.6342773
14    #<MUSIC #x1AB42B29>  7.1220703
15    #<MUSIC #x1AB42B7D>  6.724121
16    #<MUSIC #x1AB42BD1>  6.6313477
17    #<MUSIC #x1AB42C31>  6.59375
18    #<MUSIC #x1AB42C91>  6.7026367
19    #<MUSIC #x1AB42CE5>  6.6845703
20    #<MUSIC #x1AB42D45>  6.838867
21    #<MUSIC #x1AB42DB1>  6.557129
22    #<MUSIC #x1AB42E05>  6.7407227
23    #<MUSIC #x1AB42E59>  6.65625
24    #<MUSIC #x1AB42ED1>  6.7026367
25    #<MUSIC #x1AB42F25>  6.644043
26    #<MUSIC #x1AB6BF79>  6.7075195

average fitness of population 12 = 7.0995507


Generation 12 population ...

1     #<MUSIC #x1AB42409>  6.6845703
2     #<MUSIC #x1AB4242D>  6.7026367
3     #<MUSIC #x1AB42451>  6.7026367
```

```
4     #<MUSIC #x1AB42771>  6.9033203
5     #<MUSIC #x1AB427C5>  6.9455566
6     #<MUSIC #x1AB42819>  6.7927246
7     #<MUSIC #x1AB4286D>  6.8605957
8     #<MUSIC #x1AB428C1>  6.770508
9     #<MUSIC #x1AB42915>  6.848877
10    #<MUSIC #x1AB42969>  6.901367
11    #<MUSIC #x1AB429BD>  7.0549316
12    #<MUSIC #x1AB42A11>  6.723877
13    #<MUSIC #x1AB42A65>  6.831299
14    #<MUSIC #x1AB42AB9>  6.975586
15    #<MUSIC #x1AB42B25>  6.9313965
16    #<MUSIC #x1AB42B85>  6.6711426
17    #<MUSIC #x1AB42BE5>  6.9804688
18    #<MUSIC #x1AB42C45>  6.6713867
19    #<MUSIC #x1AB42CB1>  6.8598633
20    #<MUSIC #x1AB42D05>  6.668457
21    #<MUSIC #x1AB42D65>  6.8981934
22    #<MUSIC #x1AB42DB9>  6.848877
23    #<MUSIC #x1AB42E19>  6.749756
24    #<MUSIC #x1AB42E91>  6.870117
25    #<MUSIC #x1AB42EE5>  6.974365
26    #<MUSIC #x1AB5EC65>  6.66626

----------------Selection----------------
X:1
T:Selection
C:Dystopian Tuesday
M:4/4
L:1/4
Q:1/4=120
V:S clef=treble name=Melody1 snm=Melody1
V:A clef=treble name=Melody2 snm=Melody2
%%score [ ( S ) ( A ) ]
K:C
%%MIDI program 0
V:S
E2 F/2 B/2 C2 C2 C2 G/2 A C2 z4 |]
V:A
C/2' C/2' G2' C2' A' G2' z4 |]
V:S
```

```
E2 F/2 B/2 C2 C2 C2 G/2 A C2 z4 |]
V:A
C/2' C/2' G2' C2' A' G2' z4 |]
V:S
E2 F/2 B/2 C2 G/2 B2 D2 z4 |]
V:A
C/2' C/2' G2' C2' A' G2' z4 |]
[Sample 0] Melody 1 ranking (out of 10)? 2
Melody 2 ranking (out of 10)? 1

[Sample 1] Melody 1 ranking (out of 10)? 0
Melody 2 ranking (out of 10)? 0

[Sample 2] Melody 1 ranking (out of 10)? 1
Melody 2 ranking (out of 10)? 0

average fitness of population 13 = 7.1547217


Generation 13 population ...

1     #<MUSIC #x1AB42295>  6.974365
2     #<MUSIC #x1AB422B9>  6.9313965
3     #<MUSIC #x1AB422DD>  6.770508
4     #<MUSIC #x1AB425FD>  6.881958
5     #<MUSIC #x1AB42651>  6.8724365
6     #<MUSIC #x1AB426A5>  6.9125977
7     #<MUSIC #x1AB426F9>  6.975586
8     #<MUSIC #x1AB4274D>  6.7872314
9     #<MUSIC #x1AB41B05>  6.918701
10    #<MUSIC #x1AB41B71>  6.800415
11    #<MUSIC #x1AB41BC5>  6.89563
12    #<MUSIC #x1AB41C25>  6.935425
13    #<MUSIC #x1AB41C79>  6.938843
14    #<MUSIC #x1AB41CD9>  6.8460693
15    #<MUSIC #x1AB41D39>  6.8311768
16    #<MUSIC #x1AB41D8D>  6.6727295
17    #<MUSIC #x1AB41DE1>  6.8415527
18    #<MUSIC #x1AB41E41>  6.8704834
19    #<MUSIC #x1AB41EA1>  6.829712
20    #<MUSIC #x1AB41F0D>  6.9385986
```

```
21    #<MUSIC #x1AB41F61>  6.940796
22    #<MUSIC #x1AB41FCD>  6.934204
23    #<MUSIC #x1AB42021>  7.0129395
24    #<MUSIC #x1AB42075>  6.7333984
25    #<MUSIC #x1AB420E1>  6.9368896
26    #<MUSIC #x1AB42159>  6.8843994

average fitness of population 14 = 7.202815


Generation 14 population ...

1     #<MUSIC #x1AB4239D>  6.975586
2     #<MUSIC #x1AB423C1>  6.9368896
3     #<MUSIC #x1AB423E5>  6.974365
4     #<MUSIC #x1AB42705>  6.9765015
5     #<MUSIC #x1AB42759>  6.923767
6     #<MUSIC #x1AB427B9>  6.9312744
7     #<MUSIC #x1AB42825>  6.9120483
8     #<MUSIC #x1AB42879>  6.9589233
9     #<MUSIC #x1AB428CD>  6.852661
10    #<MUSIC #x1AB42921>  6.9782104
11    #<MUSIC #x1AB42975>  6.899048
12    #<MUSIC #x1AB429C9>  6.897156
13    #<MUSIC #x1AB41C81>  6.9331665
14    #<MUSIC #x1AB41CED>  6.9262695
15    #<MUSIC #x1AB41D41>  6.8849487
16    #<MUSIC #x1AB41D95>  6.920166
17    #<MUSIC #x1AB41DE9>  6.9195557
18    #<MUSIC #x1AB41E3D>  6.9382935
19    #<MUSIC #x1AB41EA9>  6.862671
20    #<MUSIC #x1AB41EFD>  6.954468
21    #<MUSIC #x1AB41F51>  6.881714
22    #<MUSIC #x1AB41FA5>  6.98114
23    #<MUSIC #x1AB42011>  6.883911
24    #<MUSIC #x1AB42065>  6.932434
25    #<MUSIC #x1AB420B9>  6.927002
26    #<MUSIC #x1AB42131>  6.908203

average fitness of population 15 = 7.227313
```

```
Generation 15 population ...

1     #<MUSIC #x1AB42351>  6.9782104
2     #<MUSIC #x1AB42375>  6.9312744
3     #<MUSIC #x1AB42399>  6.9382935
4     #<MUSIC #x1AB426B9>  6.9605713
5     #<MUSIC #x1AB4270D>  6.9145813
6     #<MUSIC #x1AB4276D>  6.9523926
7     #<MUSIC #x1AB427C1>  6.95343
8     #<MUSIC #x1AB42815>  6.9553223
9     #<MUSIC #x1AB42869>  6.995331
10    #<MUSIC #x1AB428C9>  6.9662476
11    #<MUSIC #x1AB42929>  6.9801025
12    #<MUSIC #x1AB4297D>  6.956787
13    #<MUSIC #x1AB429DD>  6.968567
14    #<MUSIC #x1AB42A31>  6.9392395
15    #<MUSIC #x1AB42A85>  6.9085693
16    #<MUSIC #x1AB42AD9>  6.9368896
17    #<MUSIC #x1AB42B39>  6.953125
18    #<MUSIC #x1AB42B99>  6.9477844
19    #<MUSIC #x1AB42BED>  6.939087
20    #<MUSIC #x1AB42C41>  6.935486
21    #<MUSIC #x1AB42CAD>  6.976349
22    #<MUSIC #x1AB42D0D>  6.9370728
23    #<MUSIC #x1AB42D79>  6.9525146
24    #<MUSIC #x1AB42DCD>  6.9473877
25    #<MUSIC #x1AB42E45>  6.942749
26    #<MUSIC #x1AB53795>  6.9154663

----------------Selection----------------
X:1
T:Selection
C:Dystopian Tuesday
M:4/4
L:1/4
Q:1/4=120
V:S clef=treble name=Melody1 snm=Melody1
V:A clef=treble name=Melody2 snm=Melody2
%%score [ ( S ) ( A ) ]
K:C
```

```
%%MIDI program 0
V:S
G2 E2 B2 G C2 C F z4 |]
V:A
A/2' E/2' A2' F' E' F/2' z4 |]
V:S
G2 E2 B2 G B/2 D/2 D A D z4 |]
V:A
A/2' E/2' A2' F' E' F/2' z4 |]
V:S
G2 E2 B2 G C2 C F z4 |]
V:A
A/2' E/2' A2' F' E' F/2' z4 |]
[Sample 0] Melody 1 ranking (out of 10)? 5
Melody 2 ranking (out of 10)? 1

[Sample 1] Melody 1 ranking (out of 10)? 6
Melody 2 ranking (out of 10)? 0

[Sample 2] Melody 1 ranking (out of 10)? 0
Melody 2 ranking (out of 10)? 0

average fitness of population 16 = 7.458631


Generation 16 population ...

1     #<MUSIC #x1AB422C1>  6.956787
2     #<MUSIC #x1AB422E5>  6.968567
3     #<MUSIC #x1AB42309>  6.9553223
4     #<MUSIC #x1AB42629>  6.9462433
5     #<MUSIC #x1AB4267D>  6.9602203
6     #<MUSIC #x1AB426D1>  6.9583282
7     #<MUSIC #x1AB42725>  6.976059
8     #<MUSIC #x1AB42779>  6.9674683
9     #<MUSIC #x1AB427CD>  6.9782257
10    #<MUSIC #x1AB42821>  6.98703
11    #<MUSIC #x1AB42875>  8.327179
12    #<MUSIC #x1AB428C9>  8.30069
13    #<MUSIC #x1AB42935>  6.9499664
14    #<MUSIC #x1AB42989>  8.302185
```

```
15    #<MUSIC #x1AB429DD>  6.980942
16    #<MUSIC #x1AB42A31>  6.9817505
17    #<MUSIC #x1AB42A85>  6.9836273
18    #<MUSIC #x1AB42AD9>  6.9115753
19    #<MUSIC #x1AB42B45>  8.319809
20    #<MUSIC #x1AB42BB1>  6.9534454
21    #<MUSIC #x1AB42C05>  6.977783
22    #<MUSIC #x1AB42C71>  6.954483
23    #<MUSIC #x1AB42CE9>  6.9908295
24    #<MUSIC #x1AB42D3D>  6.951416
25    #<MUSIC #x1AB42D91>  6.94487
26    #<MUSIC #x1AB72475>  6.9809723

average fitness of population 17 = 7.651885


Generation 17 population ...

1     #<MUSIC #x1AB42341>  6.9602203
2     #<MUSIC #x1AB42365>  8.319809
3     #<MUSIC #x1AB42389>  8.319809
4     #<MUSIC #x1AB426A9>  6.9621964
5     #<MUSIC #x1AB426FD>  6.9836273
6     #<MUSIC #x1AB42751>  6.9747925
7     #<MUSIC #x1AB427A5>  6.980942
8     #<MUSIC #x1AB427F9>  6.962906
9     #<MUSIC #x1AB4284D>  7.6571045
10    #<MUSIC #x1AB428A1>  6.9553146
11    #<MUSIC #x1AB428F5>  6.969223
12    #<MUSIC #x1AB42949>  6.9824066
13    #<MUSIC #x1AB429A9>  7.6321716
14    #<MUSIC #x1AB42A09>  6.962311
15    #<MUSIC #x1AB42A5D>  7.6432343
16    #<MUSIC #x1AB42ABD>  7.642906
17    #<MUSIC #x1AB42B29>  6.9683075
18    #<MUSIC #x1AB42B95>  7.6394196
19    #<MUSIC #x1AB42BE9>  7.6275864
20    #<MUSIC #x1AB42C3D>  6.973175
21    #<MUSIC #x1AB42CA9>  8.320068
22    #<MUSIC #x1AB42CFD>  6.9613953
23    #<MUSIC #x1AB42D51>  8.330711
```

```
24    #<MUSIC #x1AB42DA5>  7.64122
25    #<MUSIC #x1AB42E1D>  6.9589996
26    #<MUSIC #x1AB56595>  6.96727

average fitness of population 18 = 8.04895


Generation 18 population ...

1     #<MUSIC #x1AB42305>  7.64122
2     #<MUSIC #x1AB42329>  7.642906
3     #<MUSIC #x1AB4234D>  8.320068
4     #<MUSIC #x1AB4266D>  7.313431
5     #<MUSIC #x1AB426C1>  8.327736
6     #<MUSIC #x1AB42715>  7.985878
7     #<MUSIC #x1AB42769>  6.983879
8     #<MUSIC #x1AB427D5>  8.320068
9     #<MUSIC #x1AB42829>  8.331337
10    #<MUSIC #x1AB4287D>  7.6411324
11    #<MUSIC #x1AB428DD>  7.3184395
12    #<MUSIC #x1AB42931>  7.644638
13    #<MUSIC #x1AB42985>  6.9673767
14    #<MUSIC #x1AB429E5>  7.659149
15    #<MUSIC #x1AB42A51>  7.653034
16    #<MUSIC #x1AB42AB1>  6.96624
17    #<MUSIC #x1AB42B05>  7.652752
18    #<MUSIC #x1AB42B65>  6.975357
19    #<MUSIC #x1AB42BD1>  8.321701
20    #<MUSIC #x1AB42C25>  7.9842377
21    #<MUSIC #x1AB42C79>  8.330711
22    #<MUSIC #x1AB42CCD>  6.9717865
23    #<MUSIC #x1AB42D21>  7.9824486
24    #<MUSIC #x1AB42D99>  8.323532
25    #<MUSIC #x1AB42DED>  7.97612
26    #<MUSIC #x1AB828C5>  7.9885864


------------------MUSIC SAMPLE 9------------------
Melody 1: D2 E2 A C E/2 E/2 G E/2 G
Melody 2: A' C/2' F2' D' D/2' G/2'
```

```
Total Rank: 1092005/131072
Melody1 Rank: 1219591/262144
Melody2 Rank: 964419/262144
--------------------------------------------------

----------------Individual 9----------------
X:1
T:Individual 9
C:Dystopian Tuesday
M:4/4
L:1/4
Q:1/4=120
V:S clef=treble name=S
V:A clef=treble name=A
%%score [ ( S ) ( A ) ]
K:C
V:S
%%MIDI program 0
D2 E2 A C E/2 E/2 G E/2 G
V:A
A' C/2' F2' D' D/2' G/2'
NIL
[3]>
```

Code

```
; The genetic algorithm
( defmethod ga ( &aux p )
    ( setf p ( initial-population ) )
    ( display p )
    ( dotimes ( i *nr-generations* )
        ( cond
            (( = ( mod i *user-interaction-g* ) 0 )
                ( interactive-selection ( select-individuals p ) ) )
            )
        )

        ( setf p ( next-generation p ) )
```

```
        ( check-average p )
        ( display p )
    )
    ( terpri )
    ; The most fit music sample is displayed at the end
    ( display-music-sample ( most-fit-music-sample (
population-individuals p ) ) )
    ( terpri )
    ( easyabc-display ( most-fit-music-sample ( population-individuals p )
) )
    ;( display p )

)
; Constant for the total number of generations
( defconstant *nr-generations* 18)
; Constant representing how many generations pass before the user ranks
again
( defconstant *user-interaction-g* 3 )
; percentage of mutation (set at 50%)
( defconstant *pc-m* 50 )
; Constant denoting percentage of copies
( setf *pc-c* 10 )
; Global variable for the crossover percentage.
( defconstant *pc-x* 90 )
; Global variable for the size of a population.
( defconstant *population-size* 25 )
; Global variable for the size of selection.
( setf *selection-size* 3 )
```