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Solution 10

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Question 1: Particle Swarm Optimization

```
1  void updatePBest(const double f) {
2      if (f < fpbest) {
3          fpbest = f;
4          for (int i = 0; i < Dim; ++i) {
5              pbest[i] = x[i];
6          }
7      }
8  }
```

Listing 1: SwarmingParticle.h

```
1  //update my position and let's hope to have the best overall score!
2  void update(const double * const rnd1, const double * const rnd2)
3  {
4      for (int i = 0; i < Dim; i++)
5      {
6          //update velocity and position
7          v[i] = weightVelocity*v[i]
8               + weightPBest*rnd1[i]*(pbest[i]-x[i])
9               + weightLBest*rnd2[i]*(lbest[i]-x[i]);
10         x[i] += v[i];
11
12         //make sure the particle location is in the feasible domain
13         if (x[i] < lbounds[i]) {
14             // reflect
15             v[i] = -v[i];
16             x[i] = lbounds[i] + (lbounds[i] - x[i]);
17         } else if (x[i] > ubounds[i]) {
18             // reflect
19             v[i] = -v[i];
20             x[i] = ubounds[i] - (x[i] - ubounds[i]);
21         }
22         assert(x[i] >= lbounds[i]);
23         assert(x[i] <= ubounds[i]);
24     }
25 }
```

Listing 2: SwarmingParticle.h