APPLICATION OF PARTICLE SWARM OPTIMIZATION TO ESTIMATE PROJECT DURATION

PROBLEM STATEMENT:

Project evaluation and review technique, commonly referred to as PERT, is a method used to estimate time taken to complete a project. It is calculated using the formula,

T = (To + 4 Tm + Tp)/6;

Where To is optimistic time, Tm is most likely time and Tp is pessimistic time.

This time taken, however need not always be accurate since the optimistic, pessimistic and most likely time taken involve prediction as well.

The problem statement is, given a rough target duration, calculate the optimistic, pessimistic and most likely duration and therefore derive the rough time estimate required to complete the project.

ALGORITHMIC APPROACH TO THE PROBLEM:

The duration of project is calculated using PERT formula and chosen as the fitness function for PSO which is executed as follows:

1) Initialize particles with random position and velocity vectors such that position(optimum)<= position (most likely) <= position(pessimistic)
2) Loop until maximum iteration or reaching target value:

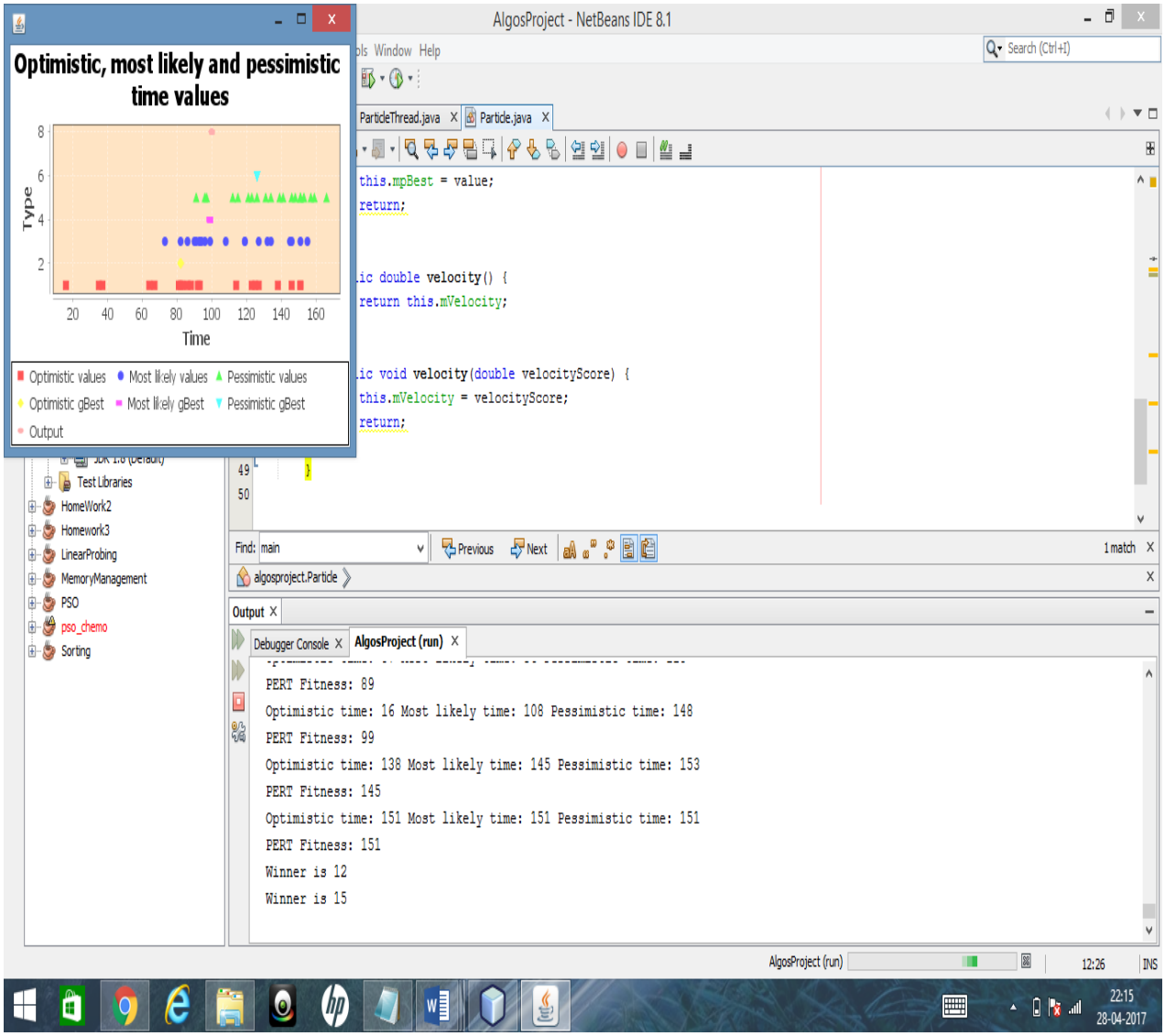
2.1 For each particle X calculate fitness function

2.2 If fitness(X) better than fitness(pBest) then pBest = X

2.3 Set the best pBest as gBest

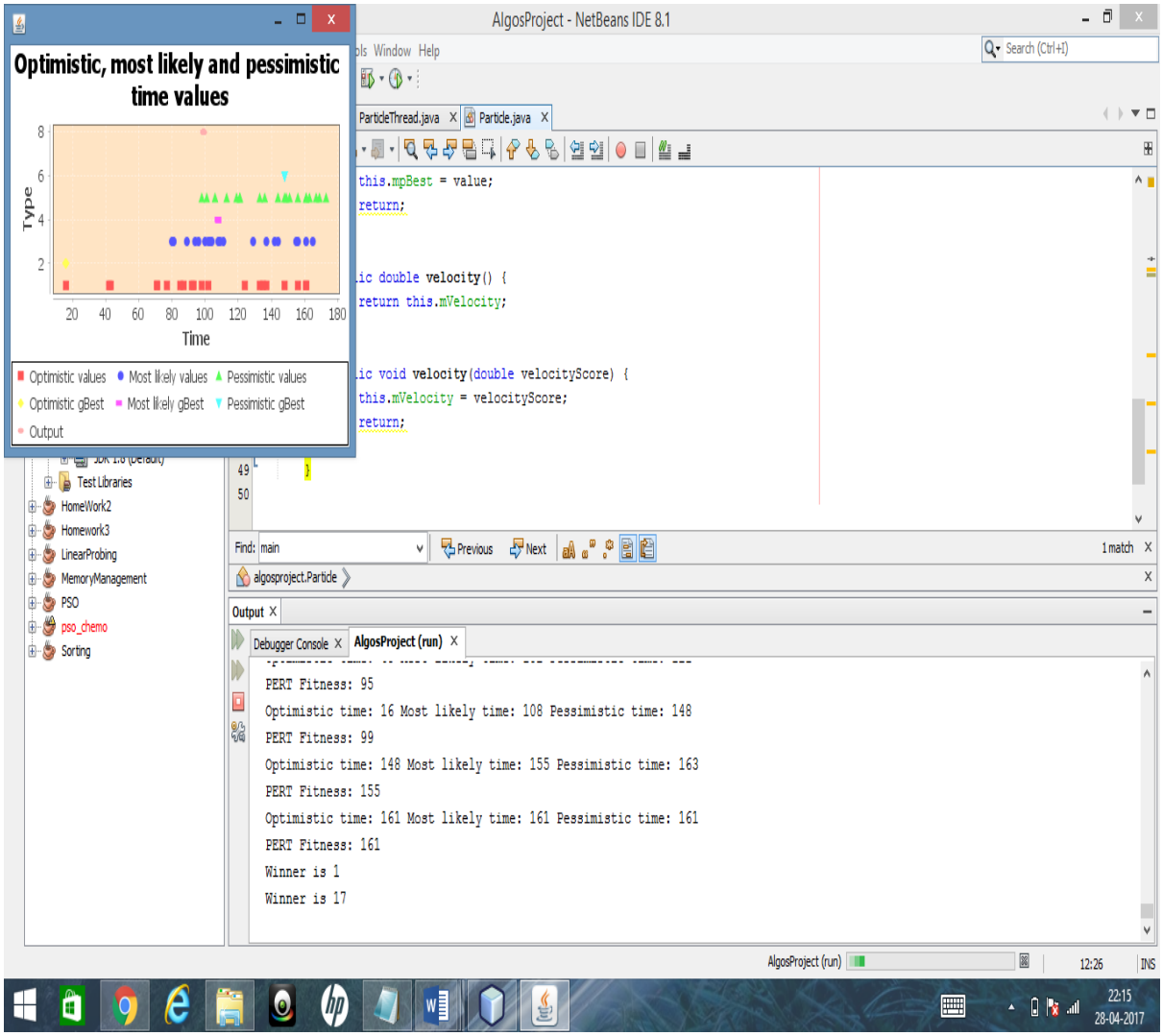
2.4 Update particle velocity and position

SCREENSHOTS



RESULT:

The optimistic, pessimistic and most likely values for the project duration can be estimated using particle swarm optimization if a rough target duration is known. It would also tell you how close your PERT analysis formula value is to the estimated target value.


Optimistic, most likely and pessimistic time values
Type
Time
Optimistic values
Most likely values
Pessimistic values
Optimistic gBest
Most likely gBest
Pessimistic gBest
Output
AlgosProject - NetBeans IDE 8.1
ParticleThread.java
Particle.java
this.mpBest = value;
return;
ic double velocity() {
return this.mVelocity;
ic void velocity(double velocityScore) {
this.mVelocity = velocityScore;
return;
Test Libraries
HomeWork2
Homework3
LinearProbing
MemoryManagement
PSO
pso_chemo
Sorting
Find: main
Previous
Next
1 match
algosproject.Particle
Output
Debugger Console
AlgosProject (run)
PERT Fitness: 95
Optimistic time: 16 Most likely time: 108 Pessimistic time: 148
PERT Fitness: 99
Optimistic time: 148 Most likely time: 155 Pessimistic time: 163
PERT Fitness: 155
Optimistic time: 161 Most likely time: 161 Pessimistic time: 161
PERT Fitness: 161
Winner is 1
Winner is 17
AlgosProject (run)
12:26
INS
22:15
28-04-2017