CS3910-Metal cutting coursework

1.  
  
In both of my algorithms, I represent the solution in the same way which was explained by E. Falkenauer [2] and R. Hinterding [3] with a one small modification.  
The pieces in the papers were assumed to be unique which is different from our problem because we have duplicates pieces. To overcome this problem I created a list that contains the indexes that map to the original pieces.

2. Genetic algorithm:

2.1:

2.2:

2.3: Crossover:

The crossover operator is a modification of Falkenauer's Bin Packing Crossover [2]. Children are essentially copies of one parent, with a segment of the second parent inserted into the copy. Groups containing items that are duplicated in other groups are removed, and new groups are built up with items that are missing because of the removal of groups,. Essentially, offspring contain groups from both parents, plus new groups composed of items from both parents.

References

[1]J. Toyoda and K. Takeyasu, "A Recursive Revised First Fit Algorithm for Cutting Stock Problem", *International Journal of Information Systems for Logistics and Management*, vol. 4, no. 1, pp. 31-40, 2008.

[2]E. Falkenauer and A. Delchambre, "A genetic algorithm for bin packing and line balancing", *Proceedings 1992 IEEE International Conference on Robotics and Automation*, pp. 1186-1193, 1992.

[3]R. Hinterding and K. Juliff, "A Genetic Algorithm for Stock Cutting: An Exploration of Mapping Schemes", *Technical Report*, 1993.