Assignment One: The Plonk Planning Problem
The assignment is to be undertaken by groups of up to four people.

The Plonk Planning Problem

Initial State
The initial state of the problem consists of a user selected total of 50 employees (Spunkees, Bligees and Plinks) and tools (Bligs and Workbenches). Whatever the user selects, the initial state will also include 0 Spunks, 0 Unserviced Plonks, as well as 0 Serviced Plonks.

Goal
The goal is to reach a state with 1000 Serviced Plonks as quickly as possible.

Possible Actions
Note that all products need to be available at the beginning, and are produced at the end of the hour.

1. Making Spunks
   Inputs: 1 Spunker, 1 Workbench
   Output: 50 Spunks
   Time: 1 Hour

2. Servicing Bligs
   Inputs: 1 Blig, 1 Bliger, 1 Workbench and 20 Spunks/1 Blig, 2 Bligers, 1 Workbench and 40 Spunks
   Output: The inputted Blig is serviced
   Time: 4 Hours / 2 Hours
   Note: Resources are total, not per hour.

3. Finding Plonks
   Inputs: 1 Plink and 10 Spunks
   Output: 10 Unserviced Plonks
   Time: 1 Hour

4. Servicing Plonks
   Inputs: 1 Plink, 1 Working Blig, 1 Workbench, 20 Spunks and 5 Unserviced Plonks
   Output: 5 Serviced Plonks
   Time: 1 Hour

Employees
- Spunkers
- Bligers
- Plinks
Tools
- Bligs

Bligs must be serviced to keep working. If a Blig is not serviced after 8 hours of use it will not work again until serviced.
- Workbenches (no requirements)

Products
- Spunks
- Unserviced Plonks

Task
Produce a program that outputs a high quality schedule for the Plonk Planning Problem given the user’s runtime specification of the available durable resources and employees. This schedule should be in the form of a timeline of all durable resources/employees and their utilization/tasks for the fastest completion of the given planning problem.

You should also offer suggestions to the user regarding how to improve their specification of the available tools and employees.

Provide a short paper explaining the structure of your program, the algorithms you used and why (no more than five pages). You must discuss:

1. How you scheduled the actions so as to meet resource constraints.
2. How you dealt with the servicing of the Bligs.
3. How you arrived at suggestions for the user.

You will be expected to perform a presentation, wherein your program will be demonstrated and explained. Questions will be asked, and specific questions can be asked to particular group members, so all members should have a reasonable grasp of all elements of the assignment.

Some suggestions:

- Read the assignment over carefully.
- Think before you program. You don’t want to waste time implementing a method that completely fails, or which is too complicated for the given time.
- Specialize: Break the task up into sub-tasks and get different members of the group to work on these sub-tasks. But remember all members must be able to answer likely questions at the presentation!
- Don’t forget to deal with degenerate cases, such as the user specifying 50 workbenches!
- Don’t get hung up on finding the global optimum.