Bicycle Alternate Design
This is a sort of a made-up exercise. It features bicycle design – a problem which has already been thoroughly solved. The purpose of this exercise is to follow the steps of embodiment design for a problem and within a domain which are well-known to most students, so that focus can be on solution methodology instead of on problem definition. To orient yourself, imagine redesigning a bicycle, taking a fresh look, with something like a recumbent or other alternative bicycle floating in your mind’s eye. Think of this as an effort to redefine and potentially optimize the traditional bicycle architecture.

Assignment:
1. Briefly fill in information on the problem definition and overall concept that you will use.
   a. Define your user (one user type is enough). What do they want a bicycle to do for them (needs)?
   b. Work out the functions of an existing bicycle that your user might choose, and associate these with the needs.
   c. Decompose these functions (maintaining solution-independence). [A better decomposition will make the product architecture, prob.2, easier to work out.]
   d. Identify a single working principle for accomplishment of each lowest-level subfunction.
2. Product Architecture. Create an excellent, need-optimizing product architecture to satisfy the design problem, iterating where appropriate. Submit:
   a. Functional schematic showing flows of force, motion, energy, material, info
   b. Clustering into modules (discuss alternatives considered)
   c. Spatial layout of modules (showing functional connections)
   d. Functional requirements listed by module
   e. Major components listed by module

Note: Graphics should be by simplified CAD. Employ CAD for basic shapes and critical interfaces – avoid the temptation to add component detail or geometric specificity. Import CAD images into the pdf that you turn in.