Several guidelines for designing safe products have been discussed in lecture and in the textbook. Furthermore, methods for performing risk assessment using kinetic energy, potential energy, and pressure points were discussed. Your task in this homework is to perform a safety analysis and risk assessment for several types of fitness activities.

1) View a video of fitness activities at:
   http://singhose.marc.gatech.edu/courses/me2110Videos/FitnessVideos_v2.mov
   Collect additional information about the fitness activities by searching the web, reading papers and books, examining safety standards (ASTM, ASME, etc.), and visiting the CRC. For many of the activities you will need to estimate the maximum weights/heights that might be used.

2) Make a list of potential risks associated with each activity. For each risk, approximate its probability of occurrence and its severity. This process will be aided by calculating the energies associated with each activity, as well as identifying high stress points that can occur during a failure.

3) Rank the activities in order from most dangerous to least dangerous. Furthermore, provide a hazard value between 0-100 for each activity. Submit this list electronically using the template spreadsheet to your TA by Sunday, 1 Feb. at 9:00pm. The average rankings made by all the students will then be returned to you on Monday, 2 Feb.

4) Select one of the activities and redesign the associated equipment or process to make it safer (maintain full functionality of the exercise if possible). Explain the improvement using a risk matrix analysis.

**Deliverable:** A short report with the following components:

a) Describe your methods for assessing the risks. Discuss any important or interesting information that you acquired, such as reports of accidents or medical studies.

b) Tabulate your list of risks for each exercise. (Limit yourself to the 5 most important risks that you identify for each activity.)

c) Report your ranked order of exercises and explain any differences from the average rankings obtained by the overall class. What did you fail to account for, or what do you think the other students in class missed that you identified to make your analysis different?

   d) Describe your design improvements and illustrate them with 1-3 figures. Be sure to discuss the design guidelines that are relevant to your product.

Your complete report should not exceed 2 pages of text; this page limit does not include the tables and figures.