CS2104: Introduction to Problem Solving, Fall 2009
Homework Assignment 5
Due at 11:00pm on Thursday, October 15
40 Points
Clarification posted on October 14

Here are the problems for Homework 8.

1. Part A (10 points) You have a chain with 21 links. You can break a link in the chain to make smaller chains, but if you do, the broken link becomes worthless. What cuts should you make in the chain to get the largest possible value of n such that you are able to create chains that sum up to each value from 1 through n? For example, if you end up with chains of length 1 and 2, then you can generate the lengths 1, 2, and 3. Explain your reasoning that led to your solution.

   Part B (10 points) Same problem as Part A, except that cut links are of value, but you need to minimize the number of cuts. This time, you should be able to get every number up to 21, but with the absolute minimum number of cuts. Note that when you cut a link, the cut link becomes its own chain of length 1. So for example, of you have a chain of 5 links and you cut the middle link, you get chains of length 1, 2, and 2.

2. (10 points) The mean IQ for children in a city with 100,000 children is 100. In a random way, you pick a sample of fifty children. The first child in the sample has an IQ of 150. What do you now expect the mean IQ to be for all children in this sample? Explain your reasoning.

3. (10 points) Nine men and two boys need to cross a river. Their only means for doing so is with a small boat, and someone has to be in the boat to row it across the river. Unfortunately, the boat can carry at most one man or two boys at a time. How can they all get across?