Consider the downside risk model of the portfolio handout, and the 2 AMPL data files given, called risk1.dat and risk2.dat.

1. Write an AMPL code to maximize the expected return regardless of what the ADR is, and run it on the two datafiles. (The values will be 2.0075 and 1.238.) After the computation is done, find out the ADR for both examples.

2. Write an AMPL code to minimize the ADR regardless of what the expected return is, and run it on the two datafiles. (The values will be 0.044 and 0.) After the computation is done, find out the expected return both examples.

3. Compare the ADR that you get in (1) and (2). Also, compare the portfolios. In which is the investment better “spread” among the securities? (i.e. which portfolio is more diversified?)

4. For this part, use only the second datafile.
   (a) First, compute the maximum expected return regardless of what the ADR is; call the value of the expected return MAXRETURN. After the computation is done, find out the ADR of this portfolio.
   (b) Then, among the portfolios which have expected return equal to MAXRETURN, find the portfolio with minimum ADR.
   (c) Compare the portfolios and ADRs in parts (4a) and (4b). What can you say?

5. For this part, again use only the second datafile.
   (a) First, compute the minimum ADR regardless of what the return is; call the value of the ADR MINADR. After the computation is done, find out the return of this portfolio.
   (b) Then, among the portfolios which have ADR equal to MINADR, find the portfolio with maximum return.
   (c) Compare the portfolios and ADRs in parts (5a) and (5b). What can you say?

6. What can you say about the idea of finding “optimal” portfolios, which only look at one of the quantities: return, and risk?