Solving integer/binary problems using Maple:

Let’s look at the Southwestern Airways problem on p.485. Solving it using the Maple codes below gets us the correct answer presented in the textbook:

with(Optimization):

CS:={x[1]+x[4]+x[7]+x[10]>=1, x[2]+x[5]+x[8]+x[11]>=1, x[3]+x[6]+x[9]+x[12]>=1, x[4]+x[7]+x[9]+x[10]+x[12]>=1, x[1]+x[6]+x[10]+x[11]>=1, x[4]+x[5]+x[9]>=1, x[7]+x[8]+x[10]+x[11]+x[12]>=1, x[2]+x[4]+x[5]+x[9]>=1, x[5]+x[8]+x[11]>=1, x[3]+x[7]+x[8]+x[12]>=1, x[6]+x[9]+x[10]+x[11]+x[12]>=1, sum(x[i],i=1..12)=3};

z:=2\*x[1]+3\*x[2]+4\*x[3]+6\*x[4]+7\*x[5]+5\*x[6]+7\*x[7]+8\*x[8]+9\*x[9]+9\*x[10]+8\*x[11]+9\*x[12];

Minimize(z,CS,assume=binary);