```
>> hw7_part1

Calling SDPT3 4.0: 318 variables, 53 equality constraints
   For improved efficiency, SDPT3 is solving the dual problem.
------------------------------------------------------------

 num. of constraints = 53
 dim. of linear var  = 270
 dim. of free   var  = 48 *** convert ublk to lblk
*****************************************************************
   SDPT3: Infeasible path-following algorithms
*****************************************************************
 version  predcorr  gam  expon  scale_data
    NT      1      0.000   1        0
it pstep dstep pinfeas dinfeas  gap      prim-obj      dual-obj    cputime
-----------------------------------------------------------------
 0|0.000|0.000|1.0e+00|2.0e+03|2.8e+08| 9.603912e+04  0.000000e+00| 0:0:00| chol  1  1
 1|1.000|0.989|1.3e-08|2.3e+01|8.0e+05| 9.055880e+04  7.148352e-01| 0:0:00| chol  1  1
 2|1.000|0.985|1.2e-07|5.1e-01|2.0e+04| 1.411114e+04 -6.925563e-01| 0:0:00| chol  1  1
 3|0.873|0.922|3.2e-06|1.0e-01|2.7e+03| 2.377683e+03 -1.341594e+00| 0:0:01| chol  1  1
 4|0.952|0.925|3.0e-07|2.9e-02|3.4e+02| 3.497500e+02  2.531386e+01| 0:0:01| chol  1  1
 5|0.803|0.346|1.3e-07|1.9e-02|1.3e+02| 1.470040e+02  2.769064e+01| 0:0:01| chol  1  1
 6|1.000|0.627|1.5e-07|7.4e-03|3.1e+01| 5.901475e+01  3.026203e+01| 0:0:01| chol  1  1
 7|0.997|0.761|9.8e-08|1.8e-03|2.1e+00| 3.366110e+01  3.190732e+01| 0:0:01| chol  1  1
 8|0.975|0.976|6.7e-09|4.5e-05|5.8e-02| 3.232558e+01  3.227403e+01| 0:0:01| chol  1  1
 9|0.989|0.989|4.9e-10|7.4e-07|6.6e-04| 3.228365e+01  3.228309e+01| 0:0:01| chol  2  2
10|0.989|0.989|8.3e-12|1.0e-06|5.0e-05| 3.228318e+01  3.228317e+01| 0:0:01| chol  2  2
11|1.000|0.989|2.1e-14|7.9e-08|3.7e-06| 3.228317e+01  3.228317e+01| 0:0:01| chol  2  2
12|1.000|0.989|1.5e-15|5.8e-09|2.7e-07| 3.228317e+01  3.228317e+01| 0:0:01|
  stop: max(relative gap, infeasibilities) < 1.49e-08
-----------------------------------------------------------------
 number of iterations   = 12
 primal objective value =  3.22831704e+01
 dual   objective value =  3.22831703e+01
 gap := trace(XZ)       = 2.75e-07
 relative gap           = 4.19e-09
 actual relative gap    = 5.38e-10
 rel. primal infeas (scaled problem)   = 1.49e-15
 rel. dual     "        "       "      = 5.83e-09
 rel. primal infeas (unscaled problem) = 0.00e+00
 rel. dual     "        "       "      = 0.00e+00
 norm(X), norm(y), norm(Z) = 1.1e+02, 1.1e+00, 5.3e+00
 norm(A), norm(b), norm(C) = 3.5e+02, 4.8e+02, 6.2e+00
 Total CPU time (secs)  = 0.73
 CPU time per iteration = 0.06
 termination code       =  0
 DIMACS: 2.5e-15  0.0e+00  2.7e-08  0.0e+00  5.4e-10  4.2e-09
-----------------------------------------------------------------

------------------------------------------------------------
Status: Solved
```

```
Optimal value (cvx_optval): -32.0515


Pg =

   16.5801
  -10.4046
    0.5177
         0
         0
    3.7124
         0
   -3.2682
   -3.2696
         0
         0
   -1.1809
         0
         0
         0
         0
         0
         0
         0
         0
         0
         0
         0
         0
         0
         0
         0
         0
         0
         0
         0
         0
         0
         0
         0
         0
         0
         0
         0
         0
         0
         0
         0
         0
         0
```

```
         0
         0
         0
         0
         0
         0
         0
         0
         0
         0
         0


Pg7 =

   16.5801
  -10.4046
    0.5177
    3.7124
   -3.2682
   -3.2696
   -1.1809


cvx_optval =

  -32.0515

>> hw7_part2
index of lowest priced bus: 4
index of highest priced bus: 9

lowest_bus_prices =

  Columns 1 through 13

    1.8093    1.8103    1.7992    1.7827    1.8047    1.7993    1.7892    1.8150↙
1.8068    1.8338    1.8289    1.8206    1.7615

  Columns 14 through 24

    1.8184    1.7911    1.8019    1.7954    1.8361    1.8090    1.8353    1.8535↙
1.8259    1.8551    1.8357


highest_bus_prices =

  Columns 1 through 13

    5.7332    5.7238    5.7303    5.7184    5.7203    5.7469    5.7601    5.7724↙
5.7710    5.7344    5.6852    5.6775    5.7321
```

```
  Columns 14 through 24

    5.6758    5.7041    5.6977    5.7307    5.7421    5.7975    5.8022    5.8025↙
5.8387    5.7863    5.7681


bus_33_prices =

  Columns 1 through 13

    4.2405    4.2350    4.2318    4.2248    4.2288    4.2385    4.2482    4.2620↙
4.2580    4.2465    4.2239    4.2138    4.2162

  Columns 14 through 24

    4.2099    4.2156    4.2196    4.2337    4.2527    4.2749    4.2905    4.2975↙
4.2990    4.2837    4.2683

>> hw7_part3

attack_idxs =

    24


detected_attacks_at =

    24


attack_idxs =

    39    53


detected_attacks_at =

    39
    53


attack_idxs =

    47    28    42


detected_attacks_at =

    28
    42
```

```
    47

>>
```