In [11]:

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#Problem 1-2
using JuMP, Cbc
m=Model()

#bars = [:1,:2,:3,:4]
#required = Dict(zip(bars, [7,2,6,3]))

#distances = [0 5 12 7 15;
#             5 0 4 10 7;
#             12 4 0 14 20;
#             7 10 14 0 8]

#travel = Dict()
#travel[:1]=[:2, :4]
#travel[:3]=[:2, :4]

options = [:1,:2,:3,:4,:5,:6,:7,:8]
distances = Dict(zip(options, [10,24,14,30,21,37,27,33])) #distance for each trip


#DVs
@variable(m, x[options], Bin)

@objective(m, Min, sum(distances[i] * x[i] for i in options))

@constraint(m, x[1]+x[5] >= 1) #bar1
@constraint(m, x[2]+x[5]+x[8] >=1) #bar2
@constraint(m, x[3]+ x[6]+x[8]>=1) #bar3
@constraint(m, x[4]+x[6]+x[7]>=1) #bar4

#@constraint(m, sum(required[i]*x[i] for i in bars)<=10) #Beer Carry Constraint
#@constraint(m, visit_bar[i in bars], sum(x[i] for i in bars)>=1) #visit each bar
#@constraint(m, cover[i in bars, j in bars_r], sum(x[i] for i in travel[j]) >= 1)


set_optimizer(m, Cbc.Optimizer)
optimize!(m)
```

```
Welcome to the CBC MILP Solver
Version: 2.10.8
Build Date: Jan  1 1970

command line - Cbc_C_Interface -solve -quit (default strategy 1)
Continuous objective value is 58 - 0.00 seconds
Cgl0004I processed model has 4 rows, 8 columns (8 integer (8 of which binary)) and 11 elements
Cutoff increment increased from 1e-05 to 0.9999
Cbc0038I Initial state - 0 integers unsatisfied sum - 0
Cbc0038I Solution found of 58
Cbc0038I Before mini branch and bound, 8 integers at bound fixed and 0 continuous
Cbc0038I Mini branch and bound did not improve solution (0.00 seconds)
Cbc0038I After 0.00 seconds - Feasibility pump exiting with objective of 58 - took 0.00 seconds
Cbc0012I Integer solution of 58 found by feasibility pump after 0 iterations and 0 nodes (0.00 seconds)
Cbc0001I Search completed - best objective 58, took 0 iterations and 0 nodes (0.00 seconds)
Cbc0035I Maximum depth 0, 0 variables fixed on reduced cost
Cuts at root node changed objective from 58 to 58
Probing was tried 0 times and created 0 cuts of which 0 were active after adding rounds of cuts (0.000 seconds)
Gomory was tried 0 times and created 0 cuts of which 0 were active after adding rounds of cuts (0.000 seconds)
Knapsack was tried 0 times and created 0 cuts of which 0 were active after adding rounds of cuts (0.000 seconds)
Clique was tried 0 times and created 0 cuts of which 0 were active after adding rounds of cuts (0.000 seconds)
MixedIntegerRounding2 was tried 0 times and created 0 cuts of which 0 were active after adding rounds of cuts (0.000 se
conds)
FlowCover was tried 0 times and created 0 cuts of which 0 were active after adding rounds of cuts (0.000 seconds)
TwoMirCuts was tried 0 times and created 0 cuts of which 0 were active after adding rounds of cuts (0.000 seconds)
ZeroHalf was tried 0 times and created 0 cuts of which 0 were active after adding rounds of cuts (0.000 seconds)

Result - Optimal solution found

Objective value:                58.00000000
Enumerated nodes:               0
Total iterations:               0
Time (CPU seconds):             0.01
Time (Wallclock seconds):       0.01

Total time (CPU seconds):       0.01   (Wallclock seconds):       0.01
```

In [ ]: