In [15]:

```
import sys
import numpy as np

from gamspy import (
    Container,Set,Alias,Parameter,Variable,Equation,Model,Problem,Sense,Opti
    Domain,Number,Sum,Product,Smax,Smin,Ord,Card,SpecialValues,
)
import gamspy.math as gpm

options = Options(seed=42)
m = Container(options=options)

i = Set(m,'player',records=['Harry_Potter', 'Ron_Weasley', 'Fred_Weasley', '
    'Oliver_Wood', 'Angelina_Johnson', 'Ginny_Weasley', 'Hermione_Granger',
    'Neville_Longbottom', 'Seamus_Finnegan', 'Dean_Thomas',
    'Romilda_Vane', 'Colin_Creevy', 'Dennis_Creevy', 'Lavender_Brown',
    'Alicia_Spinnet', 'Katie_Bell', 'Cormac_McLaggen','Demelza_Robinson'])
j = Set(m,'position')
required = Parameter(m,'required', domain=j, domain_forwarding = True,
    records=[ ('seeker', 1), ('chaser', 3), ('beater', 2), ('keeper', 1) ])

quality = Parameter(m,'quality',domain=[i,j])
quality[i,'seeker'] = gpm.uniform(32,36)
quality[i,'chaser'] = gpm.uniform(38,41)
quality[i,'beater'] = gpm.uniform(30,35)
quality[i,'keeper'] = gpm.uniform(28,38)
quality['Harry_Potter', 'seeker'] = 42

display(quality.pivot())

x = Variable(m, 'x', domain=[i, j], type='positive')

player_constraint = Equation(m, 'player_constraint', domain=i)
player_constraint[i] = Sum(j, x[i, j]) <= 1

position_constraint = Equation(m, 'position_constraint', domain=j)
position_constraint[j] = Sum(i, x[i, j]) == required[j]

objective = Sum([i, j], quality[i, j] * x[i, j])

Gryffindor = Model(m,
              name='Gryffindor',
              equations=m.getEquations(),
              problem=Problem.LP,
              sense=Sense.MAX,
              objective=objective)
```

	seeker	chaser	beater	keeper
Harry_Potter	42.000000	40.107844	34.080352	30.345572
Ron_Weasley	33.423164	39.497351	31.399243	29.848148
Fred_Weasley	34.623634	39.948404	34.917313	33.049643
George_Weasley	33.381789	39.520000	32.473133	30.623237
Oliver_Wood	35.784648	40.498367	33.711638	32.795699
Angelina_Johnson	34.719680	38.767801	30.151053	31.857933
Ginny_Weasley	33.472440	39.018418	33.268533	33.185437
Hermione_Granger	34.586713	40.010411	32.978259	29.282914
Neville_Longbottom	33.434833	38.171924	31.294828	31.793913
Seamus_Finnegan	35.783428	38.085160	34.792175	30.316590
Dean_Thomas	32.286583	40.159970	31.382841	31.966755
Romilda_Vane	35.406482	39.204210	34.842913	30.490287
Colin_Creevy	33.420760	40.917869	34.757001	37.617875
Dennis_Creevy	35.025198	38.587866	31.978963	28.632733
Lavender_Brown	32.524719	39.420422	31.183284	30.295067
Alicia_Spinnet	35.937655	38.113105	34.045302	31.326785
Katie_Bell	33.068449	39.698371	31.728261	30.312357
Cormac_McLaggen	35.022638	39.915304	34.883565	28.275941
Demelza_Robinson	32.487771	40.626142	34.314791	34.017099

In [16]:
```
# put your code here
Gryffindor.solve()
```

Out[16]:

	Solver Status	Model Status	Objective	Num of Equations	Num of Variables	Model Type	Solver	S
0	Normal	OptimalGlobal	270.703233538	24	77	LP	CPLEX	

In [17]:
```
houseScore = Parameter(m,'houseScore')
houseScore[:] = Gryffindor.objective_value

team = Set(m,'Gryffindor_team',[i,j])
team[i,j] = Number(1).where[x.l[i,j] > 0.001]
print(f"Score = {houseScore.toValue()}")
display(team.pivot(fill_value=''))
```

```
Score = 270.703233538
```

	seeker	chaser	beater	keeper
Harry_Potter	True			
Fred_Weasley			True	
Oliver_Wood		True		
Dean_Thomas		True		
Colin_Creevy				True
Cormac_McLaggen			True	
Demelza_Robinson		True		