In [15]:
```
import numpy as np
import pulp
```

In [16]:
```
model = pulp.LpProblem('Minimizing number of servers', pulp.LpMinimize
)
```

In [17]:
```
N1 = pulp.LpVariable('N1', lowBound=0, cat='Integer')
N2 = pulp.LpVariable('N2', lowBound=0, cat='Integer')
N3 = pulp.LpVariable('N3', lowBound=0, cat='Integer')
N4 = pulp.LpVariable('N4', lowBound=0, cat='Integer')
N5 = pulp.LpVariable('N5', lowBound=0, cat='Integer')
N6 = pulp.LpVariable('N6', lowBound=0, cat='Integer')
N7 = pulp.LpVariable('N7', lowBound=0, cat='Integer')
```

In [18]:
```
SERVERS = [N1, N2, N3, N4, N5, N6, N7]
```

In [19]:
```
model += np.sum(SERVERS)
```

In [20]:
```
model
```

Out[20]:
```
Minimizing number of servers:
MINIMIZE
1*N1 + 1*N2 + 1*N3 + 1*N4 + 1*N5 + 1*N6 + 1*N7 + 0
VARIABLES
0 <= N1 Integer
0 <= N2 Integer
0 <= N3 Integer
0 <= N4 Integer
0 <= N5 Integer
0 <= N6 Integer
0 <= N7 Integer
```

In [21]:
```
model += N3+N4+2*N5>=20
```

In [22]:
```
model += N2+N4+N6+2*N7 >=90
```

In [23]:
```
model += N1+N2>=15
```

In [24]:
```
model
```

Out[24]:
```
Minimizing number of servers:
MINIMIZE
1*N1 + 1*N2 + 1*N3 + 1*N4 + 1*N5 + 1*N6 + 1*N7 + 0
SUBJECT TO
_C1: N3 + N4 + 2 N5 >= 20

_C2: N2 + N4 + N6 + 2 N7 >= 90

_C3: N1 + N2 >= 15

VARIABLES
0 <= N1 Integer
0 <= N2 Integer
0 <= N3 Integer
0 <= N4 Integer
0 <= N5 Integer
0 <= N6 Integer
0 <= N7 Integer
```

In [25]:
```
model.solve()
```

Out[25]:
```
1
```

In [26]:
```
pulp.LpStatus[model.status]
```

Out[26]:
```
'Optimal'
```

Number of Servers in Each Configuration

In [27]:
```
for N in SERVERS:
    print(N, ':', int(N.varValue))
```

```
N1 : 0
N2 : 16
N3 : 0
N4 : 0
N5 : 10
N6 : 0
N7 : 37
```

Minimum Number of servers

In [28]:
```
int(pulp.value(model.objective))
```

Out[28]:
```
63
```

Number of Servers in Each Configuration

N1 : 0
N2 : 16
N3 : 0
N4 : 0
N5 : 10
N6 : 0
N7 : 37

Minimum Number of servers

63