

# Graphs in R and how it ?

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## 1 Creating graphs

```
> library("igraph")
```

```
[1] "igraph"      "stats"      "graphics"   "grDevices"  "utils"      "datasets"
[7] "methods"     "base"
```

```
> ver <- data.frame(name = c("Store1", "Store2", "Shop1", "Shop2",
+   "Source", "Dest"), opport_requir = c(150, 50, 160, 40, 0,
+   0))
```

	name	opport_requir
1	Store1	150
2	Store2	50
3	Shop1	160
4	Shop2	40
5	Source	0
6	Dest	0

```
> relations <- data.frame(from = c("Source", "Source", "Shop1",
+   "Shop2", "Store1", "Store2", "Store1", "Store2"), to = c("Store1",
+   "Store2", "Dest", "Dest", "Shop1", "Shop2", "Shop2", "Shop1"),
+   capacity = c(150, 50, 160, 40, 200, 200, 200, 200), price = c(150,
+   50, 160, 40, 200, 200, 200, 200))
```

	from	to	capacity	price
1	Source	Store1	150	150
2	Source	Store2	50	50
3	Shop1	Dest	160	160
4	Shop2	Dest	40	40
5	Store1	Shop1	200	200

```

6 Store2 Shop2      200  200
7 Store1 Shop2      200  200
8 Store2 Shop1      200  200

```

```
> g <- graph.data.frame(relations, directed = TRUE, vertices = ver)
```

```
Vertices: 6
```

```
Edges: 8
```

```
Directed: TRUE
```

```
Edges:
```

```

[0] 'Source' -> 'Store1'
[1] 'Source' -> 'Store2'
[2] 'Shop1'   -> 'Dest'
[3] 'Shop2'   -> 'Dest'
[4] 'Store1'  -> 'Shop1'
[5] 'Store2'  -> 'Shop2'
[6] 'Store1'  -> 'Shop2'
[7] 'Store2'  -> 'Shop1'

```

```
> print(g, e = TRUE, v = TRUE)
```

```
Vertices: 6
```

```
Edges: 8
```

```
Directed: TRUE
```

```
Vertex attributes:
```

```

      name opport_requir
[0] Store1           150
[1] Store2            50
[2] Shop1            160
[3] Shop2             40
[4] Source             0
[5] Dest               0

```

```
Edges and their attributes:
```

```

               capacity price
[0] 'Source' -> 'Store1'    150  150
[1] 'Source' -> 'Store2'    50   50
[2] 'Shop1'   -> 'Dest'    160  160
[3] 'Shop2'   -> 'Dest'    40   40
[4] 'Store1'  -> 'Shop1'    200  200
[5] 'Store2'  -> 'Shop2'    200  200
[6] 'Store1'  -> 'Shop2'    200  200
[7] 'Store2'  -> 'Shop1'    200  200

```

```
Vertices: 6
```

```
Edges: 8
```

Directed: TRUE

Edges:

```
[0] 'Source' -> 'Store1'
[1] 'Source' -> 'Store2'
[2] 'Shop1'   -> 'Dest'
[3] 'Shop2'   -> 'Dest'
[4] 'Store1' -> 'Shop1'
[5] 'Store2' -> 'Shop2'
[6] 'Store1' -> 'Shop2'
[7] 'Store2' -> 'Shop1'
```

```
> plot(g, vertex.shape = "crectangle", vertex.label = ver$name,
+       edge.label = relations$capacity, layout = layout.graphopt)
```

NULL

```
> s = graph.maxflow(g, "Source", "Dest", capacity = relations$capacity)
```

```
[1] 200
```

```
> cat("maxflow =", s, "\n")
```

maxflow = 200

NULL

```
> relations$capacity[5] = 110
```

```
[1] 110
```

```
> s = graph.maxflow(g, "Source", "Dest", capacity = relations$capacity)
```

```
[1] 200
```

```
> cat("maxflow =", s)
```

maxflow = 200NULL

