Feuille de Travaux Dirigés n° 7
Classifications

Exercice VII.1. Étude des caractéristiques d'un ensemble d'hôtels

Partie I : Classification hiérarchique ascendante

1. Récupérer les données dans **R** en exécutant les instructions suivantes. Penser à remplacer `"C :\\..."` par le répertoire dans lequel vous avez enregistré le fichier que vous souhaitez ouvrir.

```
> Chemin <- "C:\\..."
> hotels <- read.csv(paste(Chemin, "ESIEADMTD5_EX1.CSV",
+     sep = ""), row.names = 1)
```

2. Quelles sont les différentes variables reproduites dans le tableau au verso ? Quelle est leur nature ? Qui sont les individus et les variables sur qui on va faire porter la classification hiérarchique ascendante ? Obtenir les statistiques descriptives, les covariances et les corrélations entre les variables quantitatives du jeu de données. Créer ensuite le graphique en étoile des hôtels.

	PAYS	ETOILE	CONFORT	CHAMBRE
1	Grèce : 8	Min. :0.000	Min. :2.00	Min. : 50.0
2	Maroc :12	1st Qu. :2.000	1st Qu. :4.00	1st Qu. :148.0
3	Portugal : 5	Median :3.000	Median :5.00	Median :250.0
4	Tunisie :10	Mean :2.974	Mean :5.18	Mean :261.2
5	Turquie : 4	3rd Qu. :4.000	3rd Qu. :6.00	3rd Qu. :317.0
6		Max. :5.000	Max. :9.00	Max. :800.0

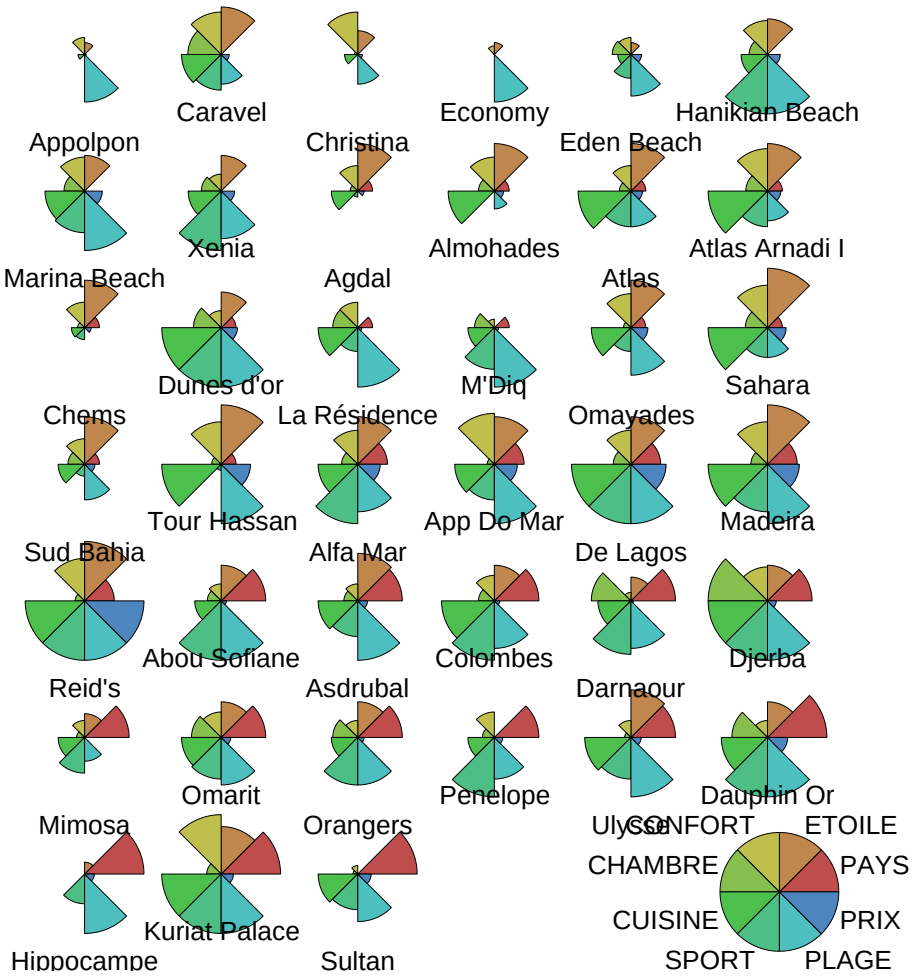
	CUISINE	SPORT	PLAGE	PRIX
1	Min. : 1.000	Min. : 0.000	Min. : 0.00	Min. : 369.0
2	1st Qu. : 5.000	1st Qu. : 4.000	1st Qu. : 6.50	1st Qu. : 447.0
3	Median : 7.000	Median : 6.000	Median : 8.00	Median : 495.0
4	Mean : 6.667	Mean : 6.231	Mean : 7.77	Mean : 529.9
5	3rd Qu. : 9.000	3rd Qu. :10.000	3rd Qu. :10.00	3rd Qu. : 574.0
6	Max. :10.000	Max. :10.000	Max. :10.00	Max. :1101.0

```
> palette(rainbow(12, s = 0.6, v = 0.75))
> stars(hotels, key.loc = c(14, 2), draw.segments = T,
+     main = "Diagramme en étoile des hôtels")
> palette("default")
```

	ETOILE	CONFORT	CHAMBRE	CUISINE	SPORT	PLAGE	PRIX
ETOILE	2.24	1.48	18.03	2.36	0.43	-0.51	111.63
CONFORT	1.48	2.47	17.01	2.32	0.19	-0.22	102.57
CHAMBRE	18.03	17.01	22449.75	167.10	246.90	74.76	-721.16
CUISINE	2.36	2.32	167.10	7.02	4.18	1.84	207.25
SPORT	0.43	0.19	246.90	4.18	11.87	4.98	147.87
PLAGE	-0.51	-0.22	74.76	1.84	4.98	7.39	126.37
PRIX	111.63	102.57	-721.16	207.25	147.87	126.37	19006.99

	ETOILE	CONFORT	CHAMBRE	CUISINE	SPORT	PLAGE	PRIX
ETOILE	1.00	0.63	0.08	0.60	0.08	-0.12	0.54
CONFORT	0.63	1.00	0.07	0.56	0.04	-0.05	0.47
CHAMBRE	0.08	0.07	1.00	0.42	0.48	0.18	-0.03
CUISINE	0.60	0.56	0.42	1.00	0.46	0.26	0.57
SPORT	0.08	0.04	0.48	0.46	1.00	0.53	0.31
PLAGE	-0.12	-0.05	0.18	0.26	0.53	1.00	0.34
PRIX	0.54	0.47	-0.03	0.57	0.31	0.34	1.00

Diagramme en étoile des hôtels



2. Faire la classification hiérarchique ascendante des observations en utilisant les distances euclidienne et Manhattan et les liaisons simple, complète et de Ward.

```
> library(cluster)
> hotelsnum <- hotels[, -1]
> res.cash <- agnes(hotelsnum, metric = "euclidean", method = "single")
> split(rownames(hotelsnum), cutree(res.cash, k = 4))
```

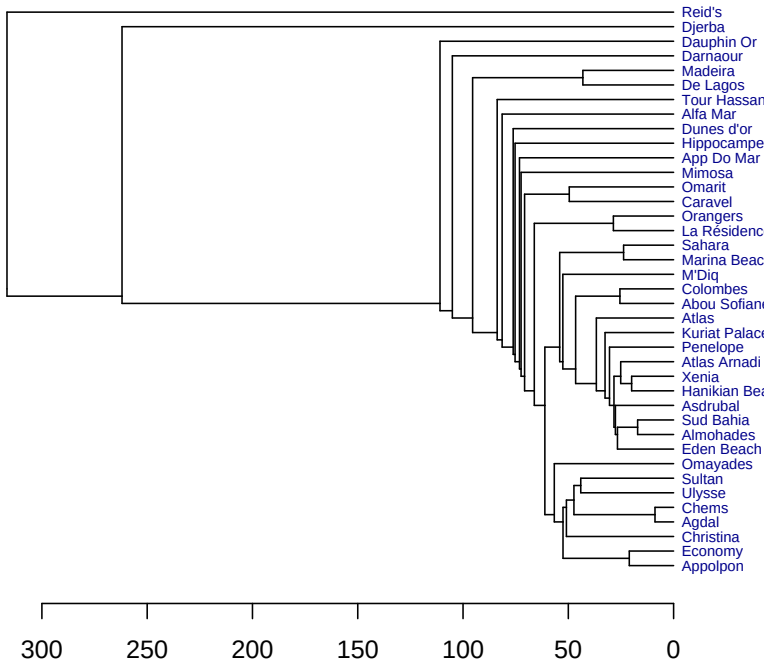
```
$`1`
 [1] "Appolpon"       "Caravel"        "Christina"
 [4] "Economy"        "Eden Beach"     "Hanikian Beach"
 [7] "Marina Beach"   "Xenia"          "Agdal"
[10] "Almohades"      "Atlas"          "Atlas Arnadi I"
[13] "Chems"          "Dunes d'or"     "La Résidence"
[16] "M'Diq"          "Omayades"       "Sahara"
[19] "Sud Bahia"      "Tour Hassan"    "Alfa Mar"
[22] "App Do Mar"     "De Lagos"       "Madeira"
[25] "Abou Sofiane"   "Asdrubal"       "Colombes"
[28] "Darnaour"       "Mimosa"         "Omarit"
[31] "Orangers"       "Penelope"       "Ulysse"
[34] "Hippocampe"     "Kuriat Palace"  "Sultan"

$`2`
[1] "Reid's"

$`3`
[1] "Djerba"

$`4`
[1] "Dauphin Or"
```

```
> res.dendro <- as.dendrogram(as.hclust(res.cash))
> plot(res.dendro, horiz = TRUE, center = TRUE, nodePar = list(lab.cex = 0.6,
+     lab.col = "darkblue", pch = NA), main = deparse(res.cash$call))
```



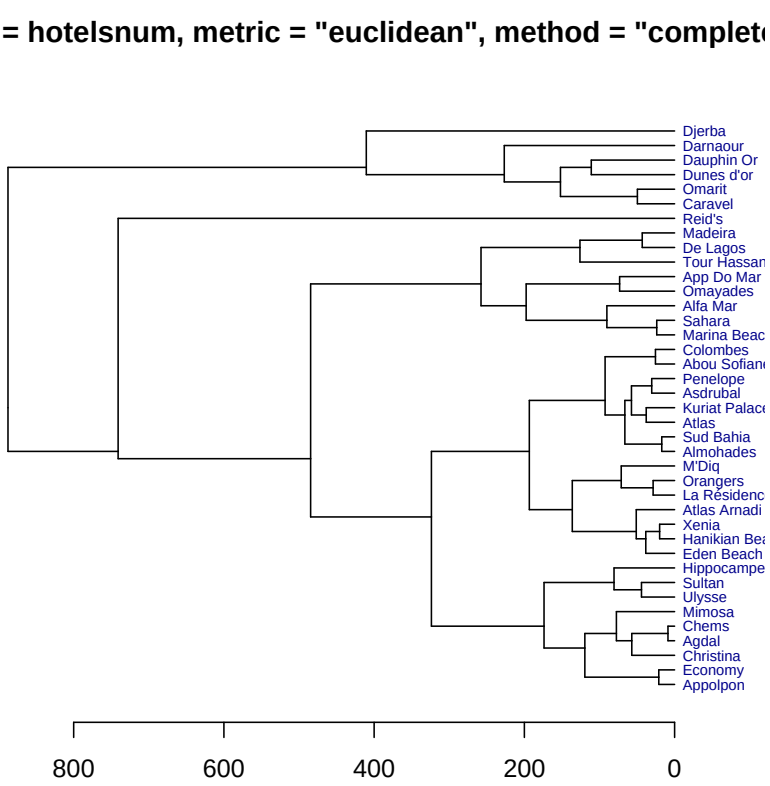

```
> res.cash <- agnes(hotelsnum, metric = "euclidean", method = "complete")
> split(rownames(hotelsnum), cutree(res.cash, k = 4))
$`1`
 [1] "Appolpon"       "Christina"      "Economy"
 [4] "Eden Beach"     "Hanikian Beach" "Xenia"
 [7] "Agdal"          "Almohades"      "Atlas"
[10] "Atlas Arnadi I" "Chems"          "La Résidence"
[13] "M'Diq"          "Sud Bahia"      "Abou Sofiane"
[16] "Asdrubal"       "Colombes"       "Mimosa"
[19] "Orangers"       "Penelope"       "Ulysse"
[22] "Hippocampe"     "Kuriat Palace"  "Sultan"

$`2`
[1] "Caravel"    "Dunes d'or" "Darnaour"   "Djerba"     "Omarit"
[6] "Dauphin Or"

$`3`
[1] "Marina Beach" "Omayades"     "Sahara"       "Tour Hassan"
[5] "Alfa Mar"     "App Do Mar"   "De Lagos"     "Madeira"

$`4`
[1] "Reid's"
```

```
> res.dendro <- as.dendrogram(as.hclust(res.cash))
> plot(res.dendro, horiz = TRUE, center = TRUE, nodePar = list(lab.cex = 0.6,
+     lab.col = "darkblue", pch = NA), main = deparse(res.cash$call))
```



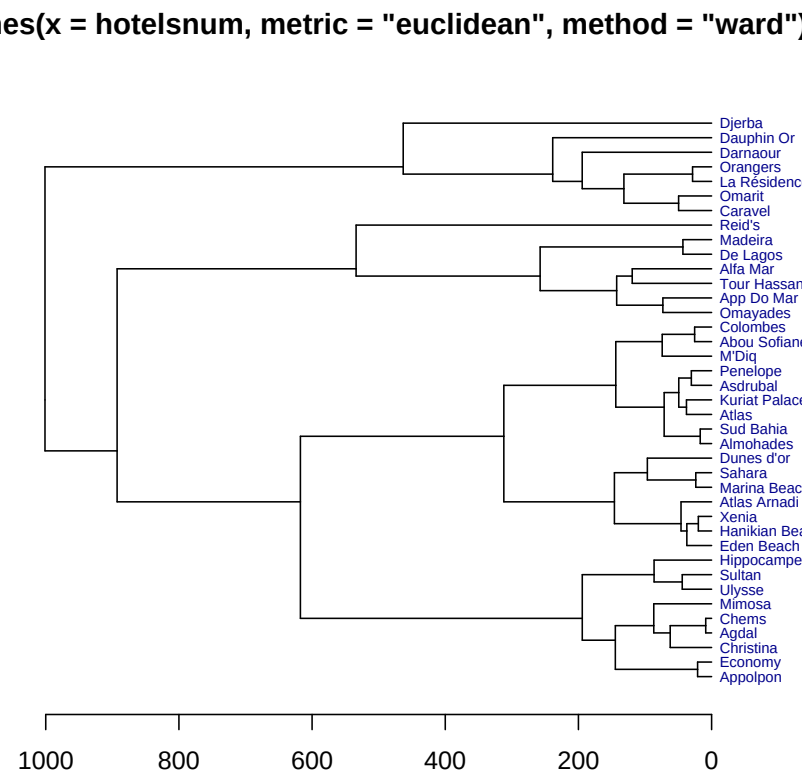

```
> res.cash <- agnes(hotelsnum, metric = "euclidean", method = "ward")
> split(rownames(hotelsnum), cutree(res.cash, k = 4))
$`1`
[1] "Appolpon"   "Christina"  "Economy"    "Agdal"      "Chems"
[6] "Mimosa"     "Ulysse"     "Hippocampe" "Sultan"

$`2`
[1] "Caravel"      "La Résidence" "Darnaour"     "Djerba"
[5] "Omarit"       "Orangers"     "Dauphin Or"

$`3`
 [1] "Eden Beach"     "Hanikian Beach" "Marina Beach"
 [4] "Xenia"          "Almohades"      "Atlas"
 [7] "Atlas Arnadi I" "Dunes d'or"     "M'Diq"
[10] "Sahara"         "Sud Bahia"      "Abou Sofiane"
[13] "Asdrubal"       "Colombes"       "Penelope"
[16] "Kuriat Palace"
```

```
$`4`
[1] "Omayades"    "Tour Hassan" "Alfa Mar"    "App Do Mar"
[5] "De Lagos"    "Madeira"     "Reid's"
```

```
> res.dendro <- as.dendrogram(as.hclust(res.cash))
> plot(res.dendro, horiz = TRUE, center = TRUE, nodePar = list(lab.cex = 0.6,
+     lab.col = "darkblue", pch = NA), main = deparse(res.cash$call))
```




```
> res.cash <- agnes(hotelsnum, metric = "manhattan", method = "single")
> split(rownames(hotelsnum), cutree(res.cash, k = 4))
```

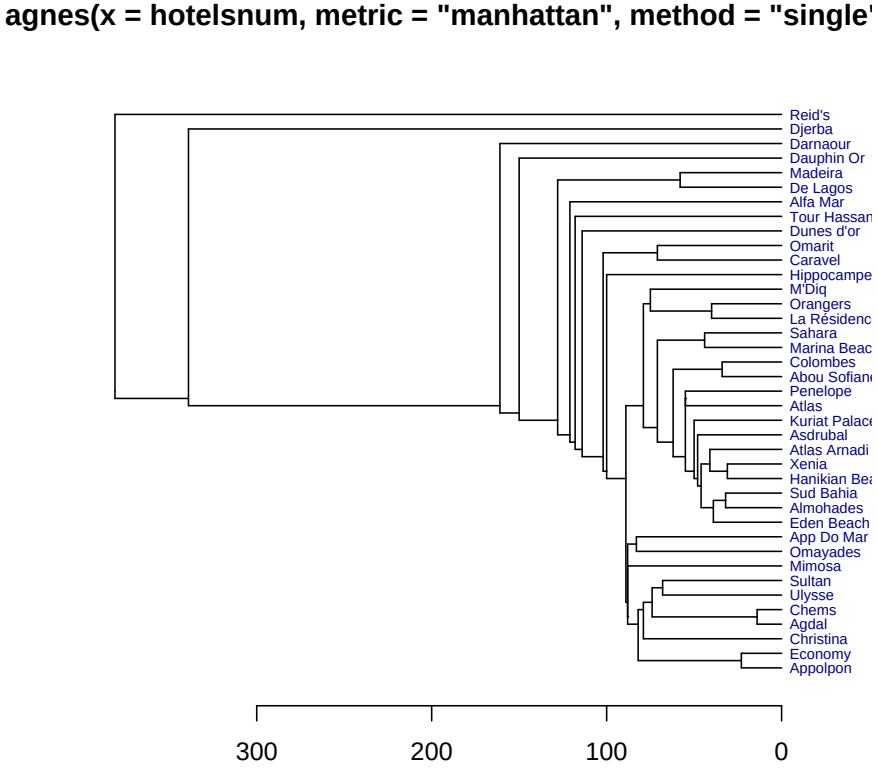
```
$`1`
 [1] "Appolpon"       "Caravel"        "Christina"
 [4] "Economy"        "Eden Beach"     "Hanikian Beach"
 [7] "Marina Beach"   "Xenia"          "Agdal"
[10] "Almohades"      "Atlas"          "Atlas Arnadi I"
[13] "Chems"          "Dunes d'or"     "La Résidence"
[16] "M'Diq"          "Omayades"       "Sahara"
[19] "Sud Bahia"      "Tour Hassan"    "Alfa Mar"
[22] "App Do Mar"     "De Lagos"       "Madeira"
[25] "Abou Sofiane"   "Asdrubal"       "Colombes"
[28] "Mimosa"         "Omarit"         "Orangers"
[31] "Penelope"       "Ulysse"         "Dauphin Or"
[34] "Hippocampe"     "Kuriat Palace"  "Sultan"
```

```
$`2`
[1] "Reid's"

$`3`
[1] "Darnaour"

$`4`
[1] "Djerba"
```

```
> res.dendro <- as.dendrogram(as.hclust(res.cash))
> plot(res.dendro, horiz = TRUE, center = TRUE, nodePar = list(lab.cex = 0.6,
+     lab.col = "darkblue", pch = NA), main = deparse(res.cash$call))
```




```
> res.cash <- agnes(hotelsnum, metric = "manhattan", method = "complete")
> split(rownames(hotelsnum), cutree(res.cash, k = 4))
```

```
$`1`
 [1] "Appolpon"       "Christina"      "Economy"
 [4] "Eden Beach"     "Hanikian Beach" "Xenia"
 [7] "Agdal"          "Almohades"      "Atlas"
[10] "Chems"          "M'Diq"          "Sud Bahia"
[13] "Abou Sofiane"   "Asdrubal"       "Colombes"
[16] "Mimosa"         "Penelope"       "Ulysse"
```

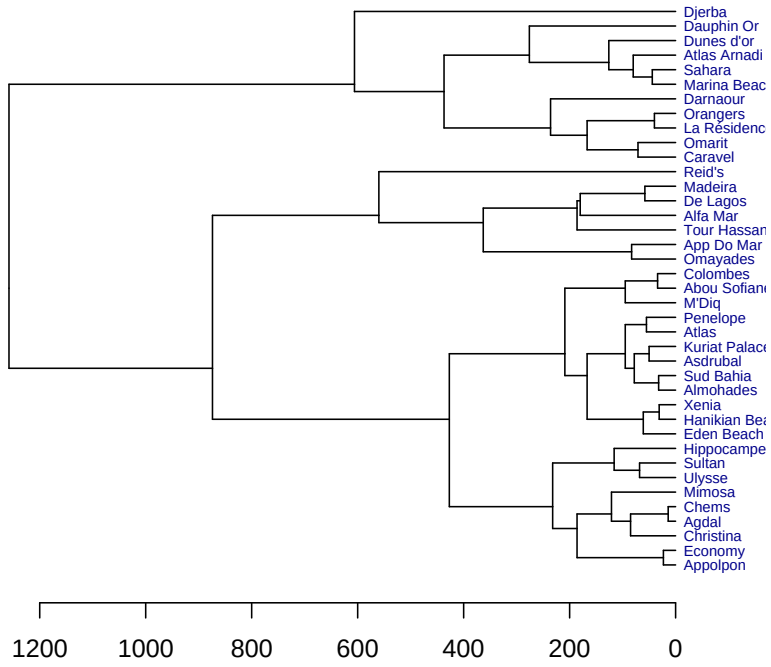
```
[19] "Hippocampe"     "Kuriat Palace"  "Sultan"

$`2`
 [1] "Caravel"        "Marina Beach"   "Atlas Arnadi I"
 [4] "Dunes d'or"     "La Résidence"   "Sahara"
 [7] "Darnaour"       "Omarit"         "Orangers"
[10] "Dauphin Or"

$`3`
[1] "Omayades"    "Tour Hassan" "Alfa Mar"    "App Do Mar"
[5] "De Lagos"    "Madeira"     "Reid's"

$`4`
[1] "Djerba"
```

```
> res.dendro <- as.dendrogram(as.hclust(res.cash))
> plot(res.dendro, horiz = TRUE, center = TRUE, nodePar = list(lab.cex = 0.6,
+     lab.col = "darkblue", pch = NA), main = deparse(res.cash$call))
```




```
> res.cash <- agnes(hotelsnum, metric = "manhattan", method = "ward")
> split(rownames(hotelsnum), cutree(res.cash, k = 4))

$`1`
[1] "Appolpon"   "Christina"  "Economy"    "Agdal"      "Chems"
```

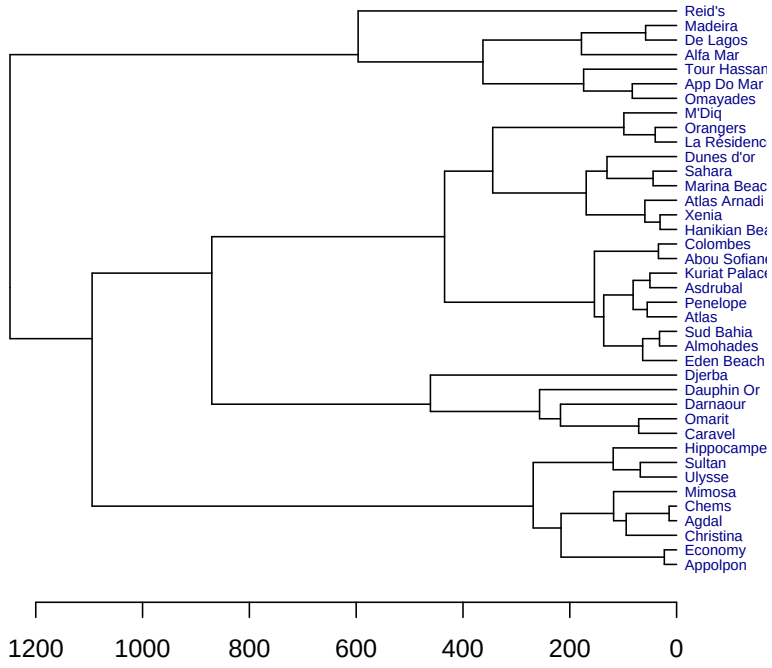
```
[6] "Mimosa"     "Ulysse"     "Hippocampe" "Sultan"

$`2`
[1] "Caravel"    "Darnaour"   "Djerba"     "Omarit"     "Dauphin Or"

$`3`
 [1] "Eden Beach"     "Hanikian Beach" "Marina Beach"
 [4] "Xenia"          "Almohades"      "Atlas"
 [7] "Atlas Arnadi I" "Dunes d'or"     "La Résidence"
[10] "M'Diq"          "Sahara"         "Sud Bahia"
[13] "Abou Sofiane"   "Asdrubal"       "Colombes"
[16] "Orangers"       "Penelope"       "Kuriat Palace"

$`4`
[1] "Omayades"    "Tour Hassan" "Alfa Mar"    "App Do Mar"
[5] "De Lagos"    "Madeira"     "Reid's"
```

```
> res.dendro <- as.dendrogram(as.hclust(res.cash))
> plot(res.dendro, horiz = TRUE, center = TRUE, nodePar = list(lab.cex = 0.6,
+     lab.col = "darkblue", pch = NA), main = deparse(res.cash$call))
```



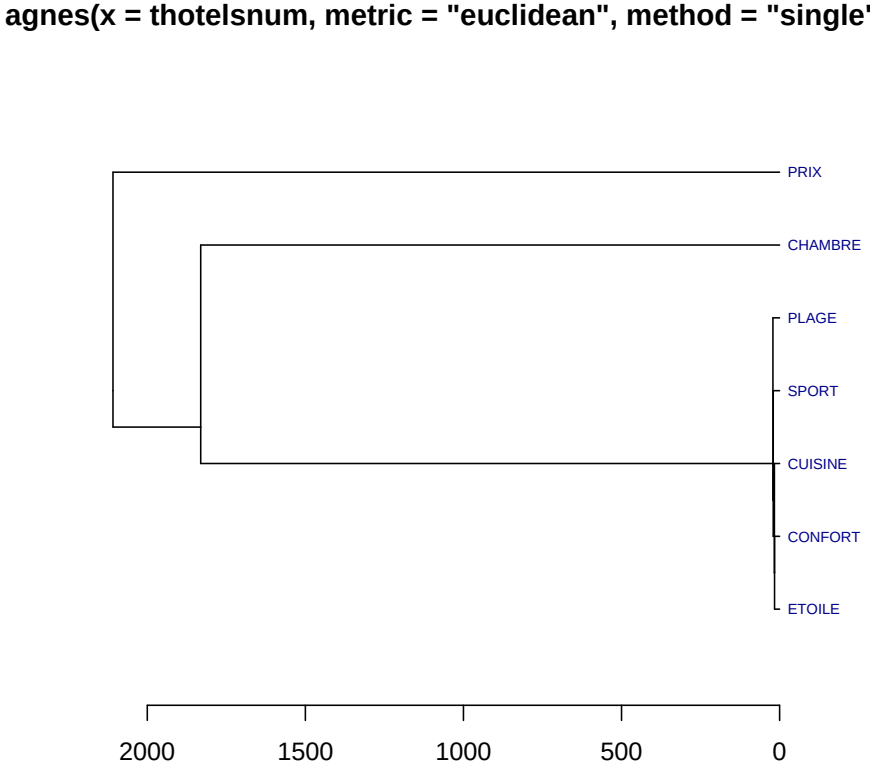
3. Faire la classification hiérarchique ascendante des variables en utilisant les distances euclidienne et Manhattan et les liaisons simple, complète et de Ward.

```
> thotelsnum <- t(hotelsnum)
> res.cash <- agnes(thotelsnum, metric = "euclidean",
+     method = "single")
> split(rownames(thotelsnum), cutree(res.cash, k = 4))
$`1`
[1] "ETOILE"  "CONFORT" "CUISINE" "SPORT"

$`2`
[1] "CHAMBRE"

$`3`
[1] "PLAGE"

$`4`
[1] "PRIX"
> res.dendro <- as.dendrogram(as.hclust(res.cash))
> plot(res.dendro, horiz = TRUE, center = TRUE, nodePar = list(lab.cex = 0.6,
+     lab.col = "darkblue", pch = NA), main = deparse(res.cash$call))
```



```
> res.cash <- agnes(thotelsnum, metric = "euclidean",
+     method = "complete")
> split(rownames(thotelsnum), cutree(res.cash, k = 4))
```

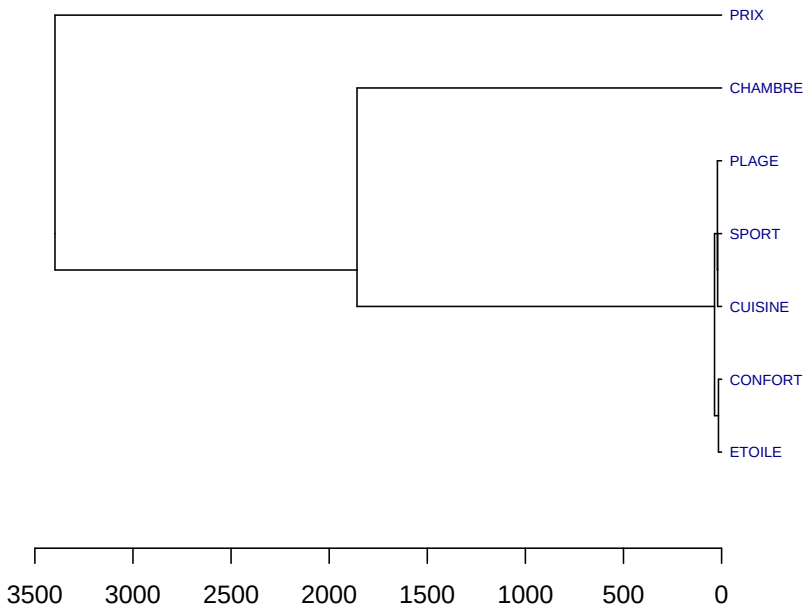
```
$`1`
[1] "ETOILE"  "CONFORT"

$`2`
[1] "CHAMBRE"

$`3`
[1] "CUISINE" "SPORT"   "PLAGE"

$`4`
[1] "PRIX"
```

```
> res.dendro <- as.dendrogram(as.hclust(res.cash))
> plot(res.dendro, horiz = TRUE, center = TRUE, nodePar = list(lab.cex = 0.6,
+     lab.col = "darkblue", pch = NA), main = deparse(res.cash$call))
```




```
> res.cash <- agnes(thotelsnum, metric = "euclidean",
+     method = "ward")
> split(rownames(thotelsnum), cutree(res.cash, k = 4))
```

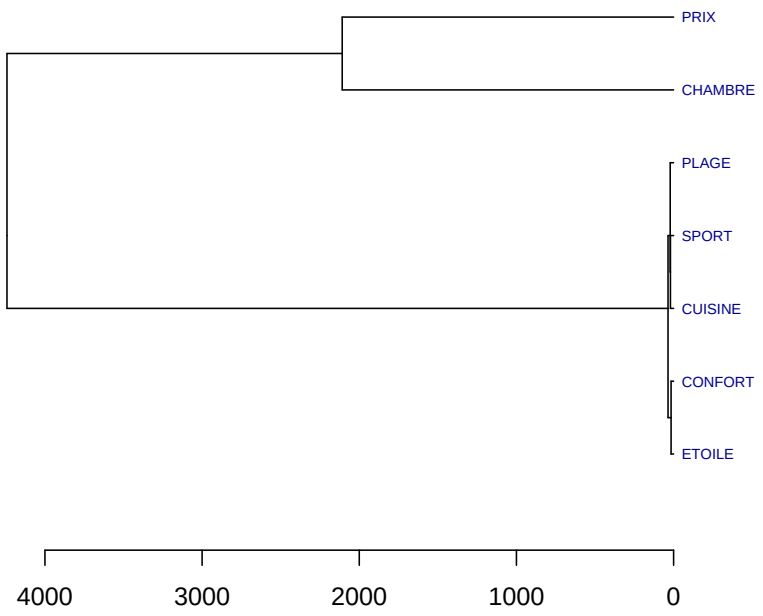
```
$`1`
[1] "ETOILE"  "CONFORT"

$`2`
[1] "CHAMBRE"

$`3`
[1] "CUISINE" "SPORT"   "PLAGE"

$`4`
[1] "PRIX"
```

```
> res.dendro <- as.dendrogram(as.hclust(res.cash))
> plot(res.dendro, horiz = TRUE, center = TRUE, nodePar = list(lab.cex = 0.6,
+     lab.col = "darkblue", pch = NA), main = deparse(res.cash$call))
```




```
> res.cash <- agnes(thotelsnum, metric = "manhattan",
+     method = "single")
> split(rownames(thotelsnum), cutree(res.cash, k = 4))
```

```
$`1`
[1] "ETOILE"  "CONFORT" "CUISINE"

$`2`
```

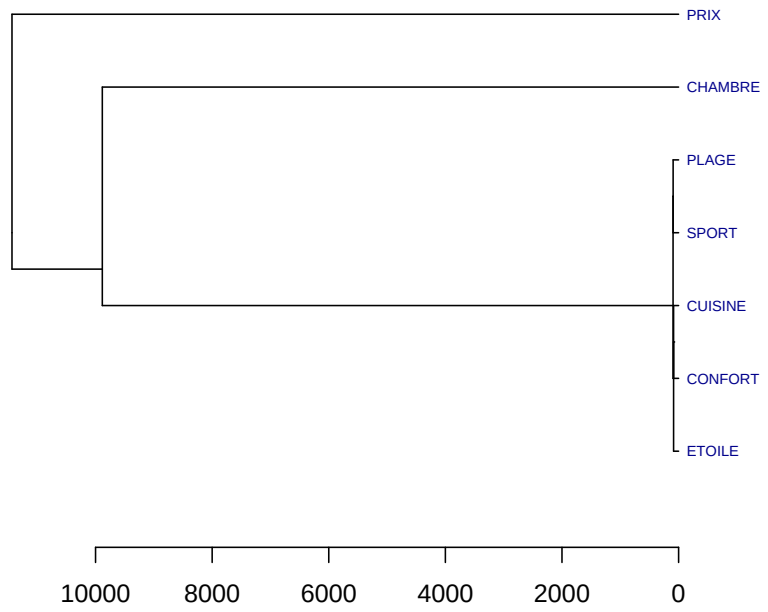
```
[1] "CHAMBRE"

$`3`
[1] "SPORT" "PLAGE"

$`4`
[1] "PRIX"
```

```
> res.dendro <- as.dendrogram(as.hclust(res.cash))
> plot(res.dendro, horiz = TRUE, center = TRUE, nodePar = list(lab.cex = 0.6,
+     lab.col = "darkblue", pch = NA), main = deparse(res.cash$call))
```

agnes(x = thotelsnum, metric = "manhattan", method = "single



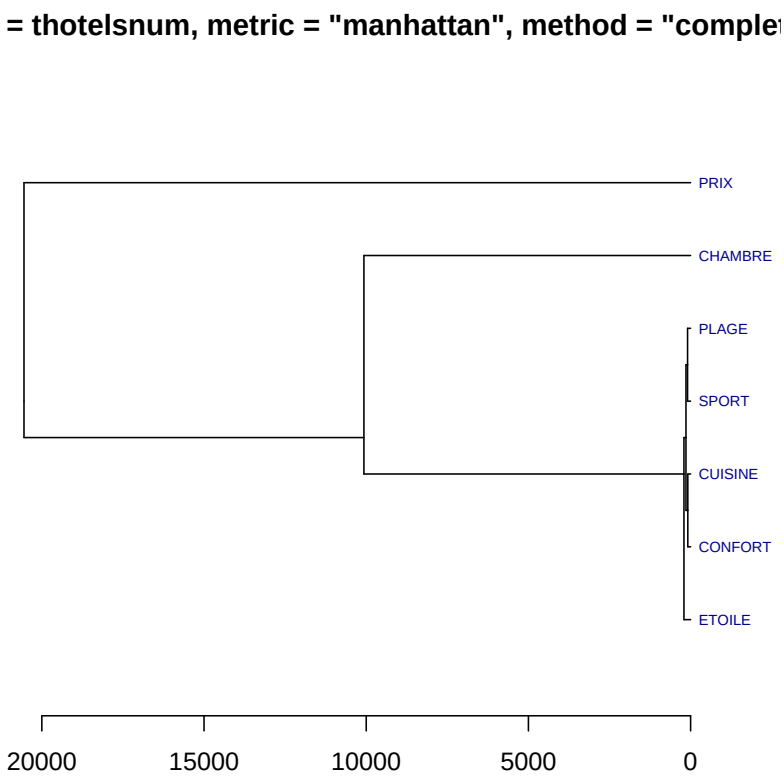

```
> res.cash <- agnes(thotelsnum, metric = "manhattan",
+     method = "complete")
> split(rownames(thotelsnum), cutree(res.cash, k = 4))
$`1`
[1] "ETOILE"

$`2`
[1] "CONFORT" "CUISINE" "SPORT"   "PLAGE"

$`3`
[1] "CHAMBRE"
```

```
$`4`
[1] "PRIX"
```

```
> res.dendro <- as.dendrogram(as.hclust(res.cash))
> plot(res.dendro, horiz = TRUE, center = TRUE, nodePar = list(lab.cex = 0.6,
+     lab.col = "darkblue", pch = NA), main = deparse(res.cash$call))
```




```
> res.cash <- agnes(thotelsnum, metric = "manhattan",
+     method = "ward")
> split(rownames(thotelsnum), cutree(res.cash, k = 4))
```

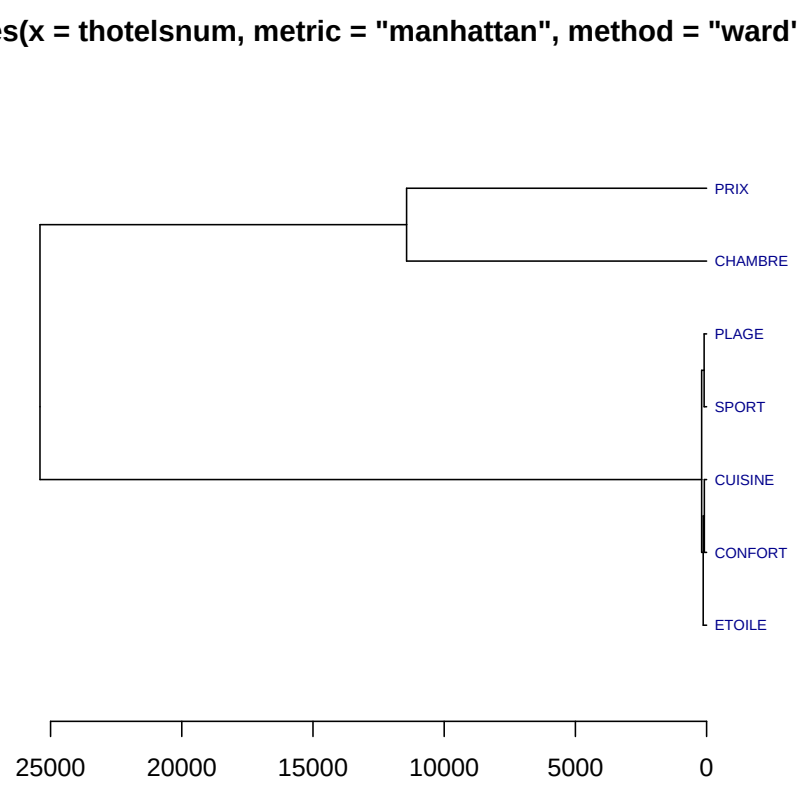
```
$`1`
[1] "ETOILE"  "CONFORT" "CUISINE"

$`2`
[1] "CHAMBRE"

$`3`
[1] "SPORT" "PLAGE"

$`4`
[1] "PRIX"
```

```
> res.dendro <- as.dendrogram(as.hclust(res.cash))
> plot(res.dendro, horiz = TRUE, center = TRUE, nodePar = list(lab.cex = 0.6,
+     lab.col = "darkblue", pch = NA), main = deparse(res.cash$call))
```

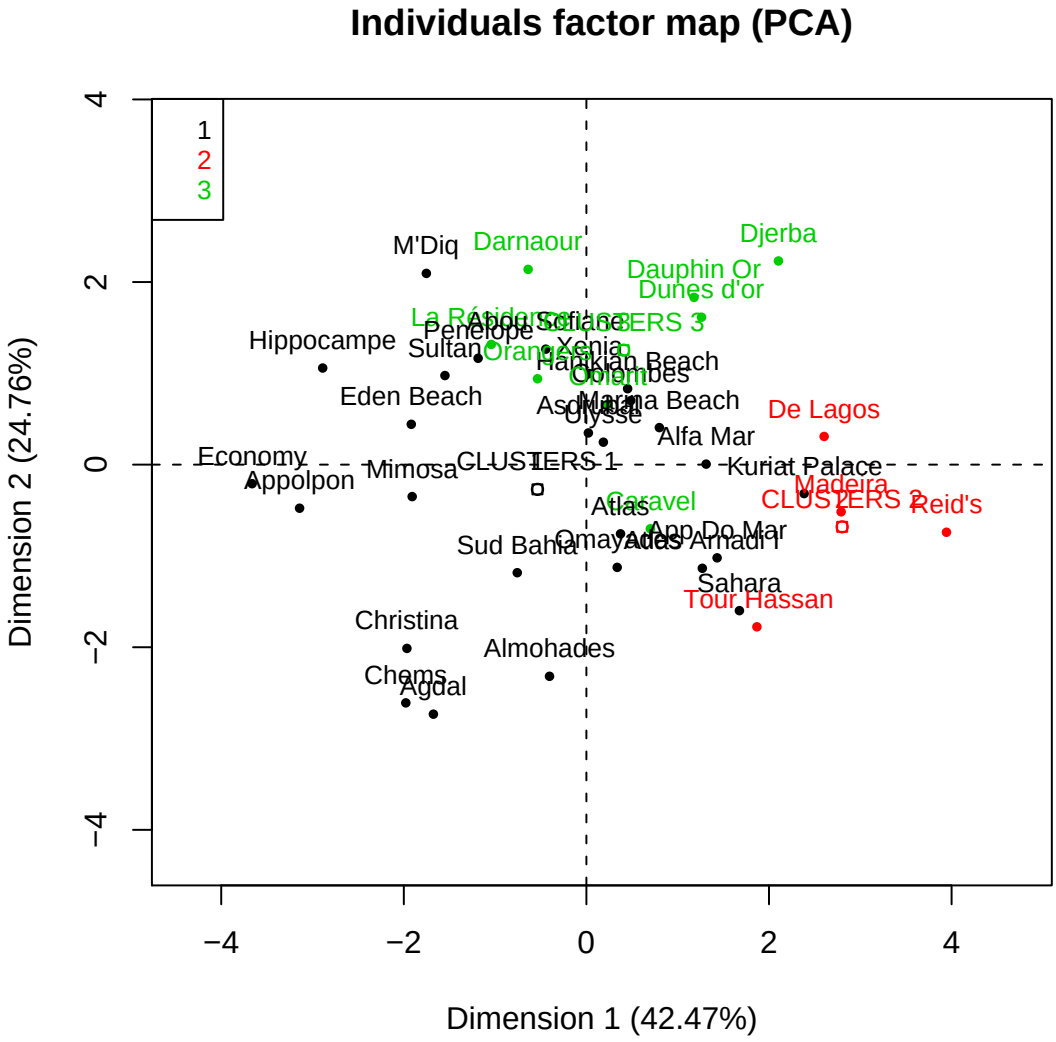


Partie II : K-moyennes

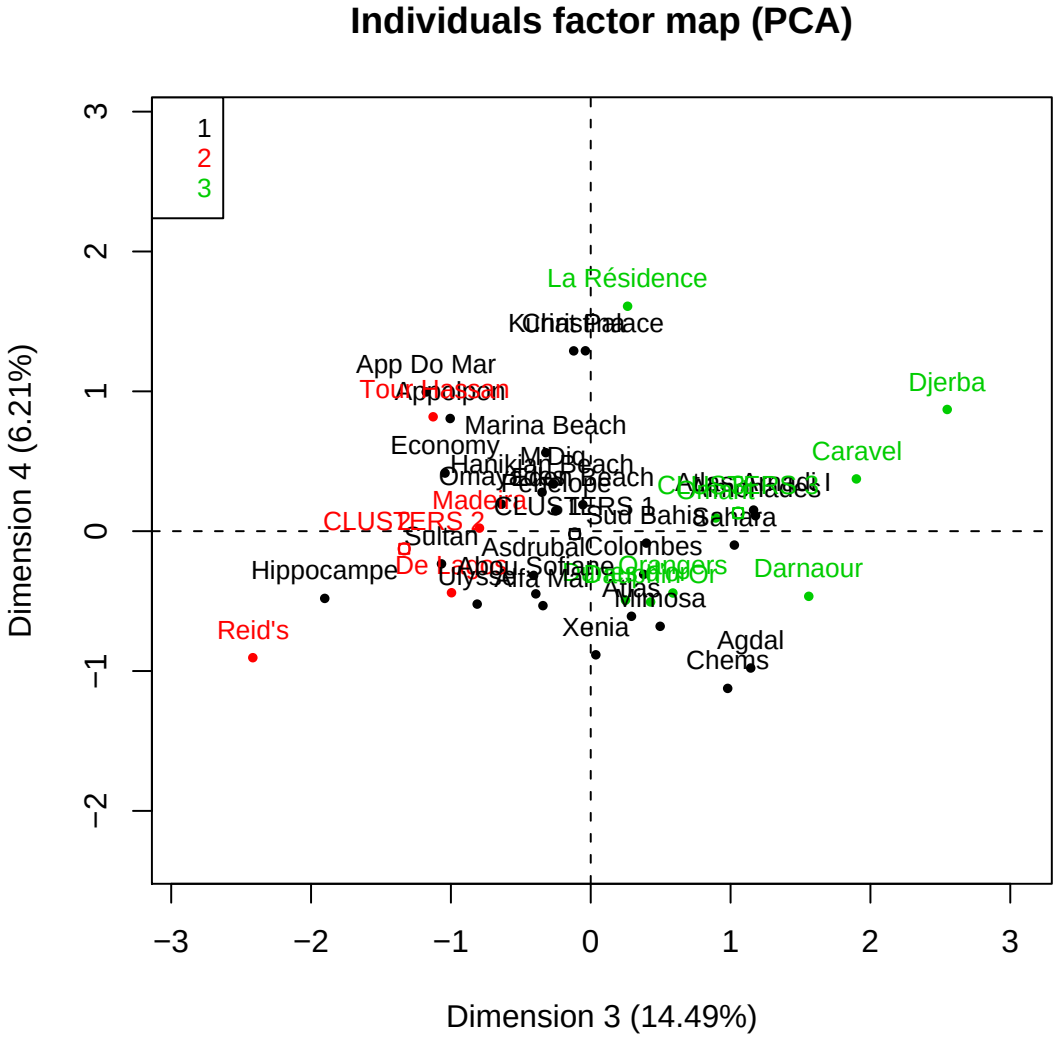
1. Obtenir la classification des hôtels en trois groupes à l'aide de la méthode des $K-$moyennes qui portera sur toutes les variables du tableau. Représenter graphiquement les trois groupes sur les premier et second plans factoriels qui ont été déterminés au TD 7. Qu'observe-t-on ? Comment se répartissent les groupes ?

```
> clhotel <- kmeans(hotelsnum, 3, nstart = 50)
> colhotnum <- cbind(factor(clhotel$cluster), hotelsnum)
> colcennum <- cbind(factor(1:3), clhotel$centers)
> colnames(colhotnum) <- c("CLUSTERS", colnames(hotelsnum))
> colnames(colcennum) <- c("CLUSTERS", colnames(hotelsnum))
> datas <- rbind(colcennum, colhotnum)
> datas$CLUSTERS <- factor(datas$CLUSTERS)
> plot(hotelsnum, col = colhotnum$CLUSTERS)
> library(FactoMineR)
```

```
> res.pca <- PCA(datas, graph = FALSE, quali.sup = 1,
+     ind.sup = 1:3)
> plot(res.pca, habillage = 1, new.plot = FALSE, cex = 0.8)
```



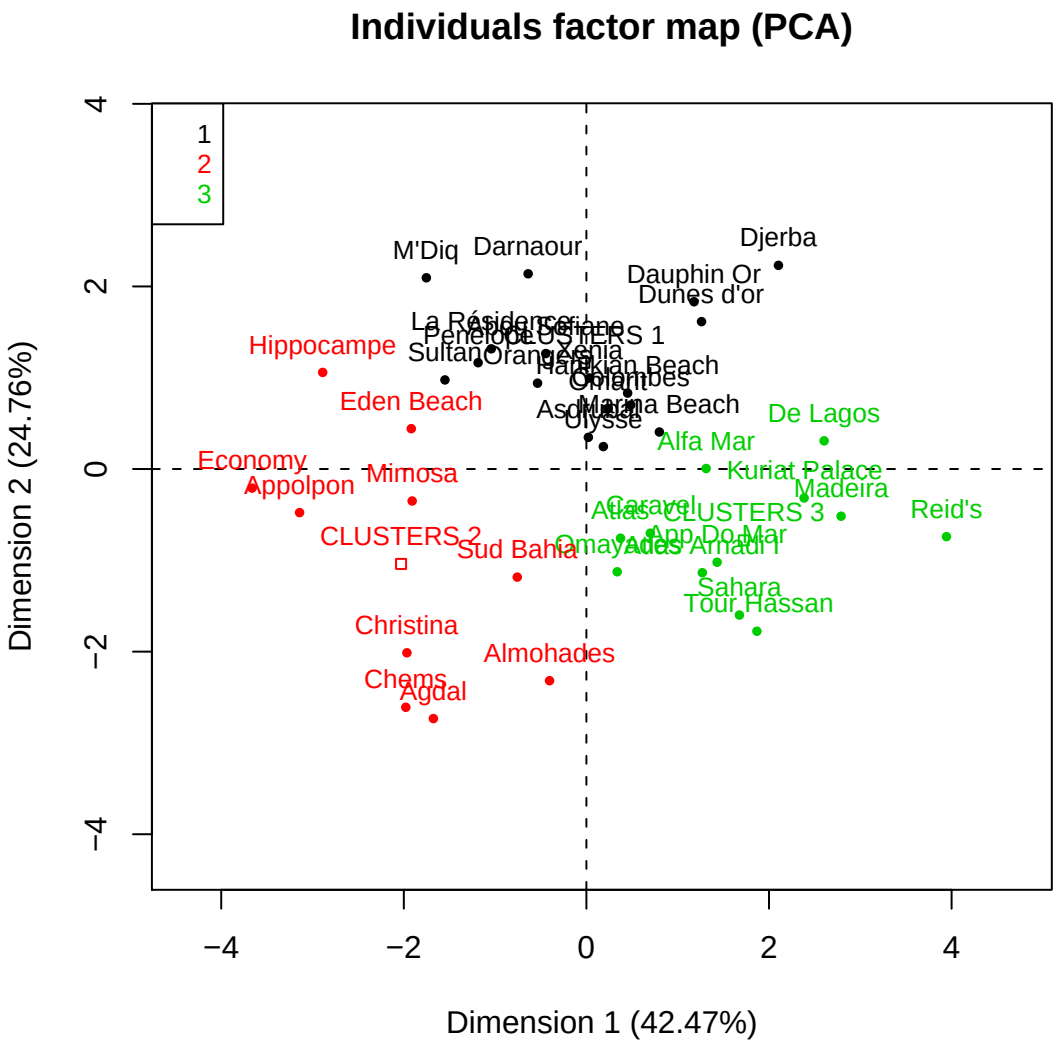

```
> plot(res.pca, axes = c(3, 4), habillage = 1, new.plot = FALSE,
+     cex = 0.8)
```



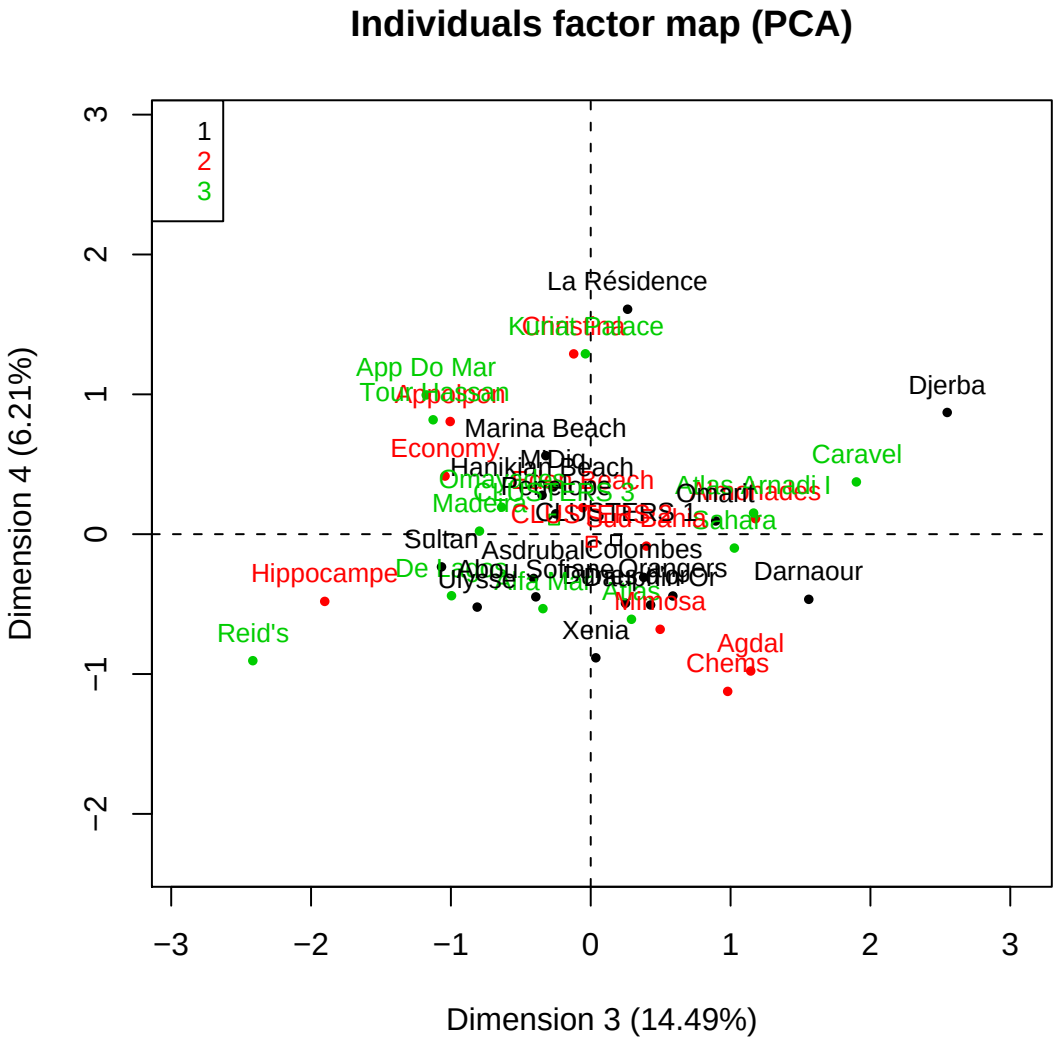
2. Obtenir la classification des hôtels en trois groupes à l'aide de la méthode des $K-$moyennes qui portera sur les coordonnées des hôtels dans le premier plan factoriel. Représenter graphiquement ces trois nouveaux groupes sur le premier plan factoriel. Qu'observe-t-on ? Comment se répartissent les groupes ?

```
> clhotel2 <- kmeans(res.pca$ind$coord[, 1:4], 3, nstart = 50)
> colhotnum2 <- data.frame(cbind(factor(clhotel2$cluster),
+     hotelsnum))
> colnames(colhotnum2) <- c("CLUSTERS", colnames(hotelsnum))
> datas2 <- colhotnum2
> datas2$CLUSTERS <- factor(datas2$CLUSTERS)
> plot(hotelsnum, col = colhotnum2$CLUSTERS)
```

```
> res.pca2 <- PCA(datas2, graph = FALSE, quali.sup = 1)
> plot(res.pca2, habillage = 1, new.plot = FALSE, cex = 0.8)
```



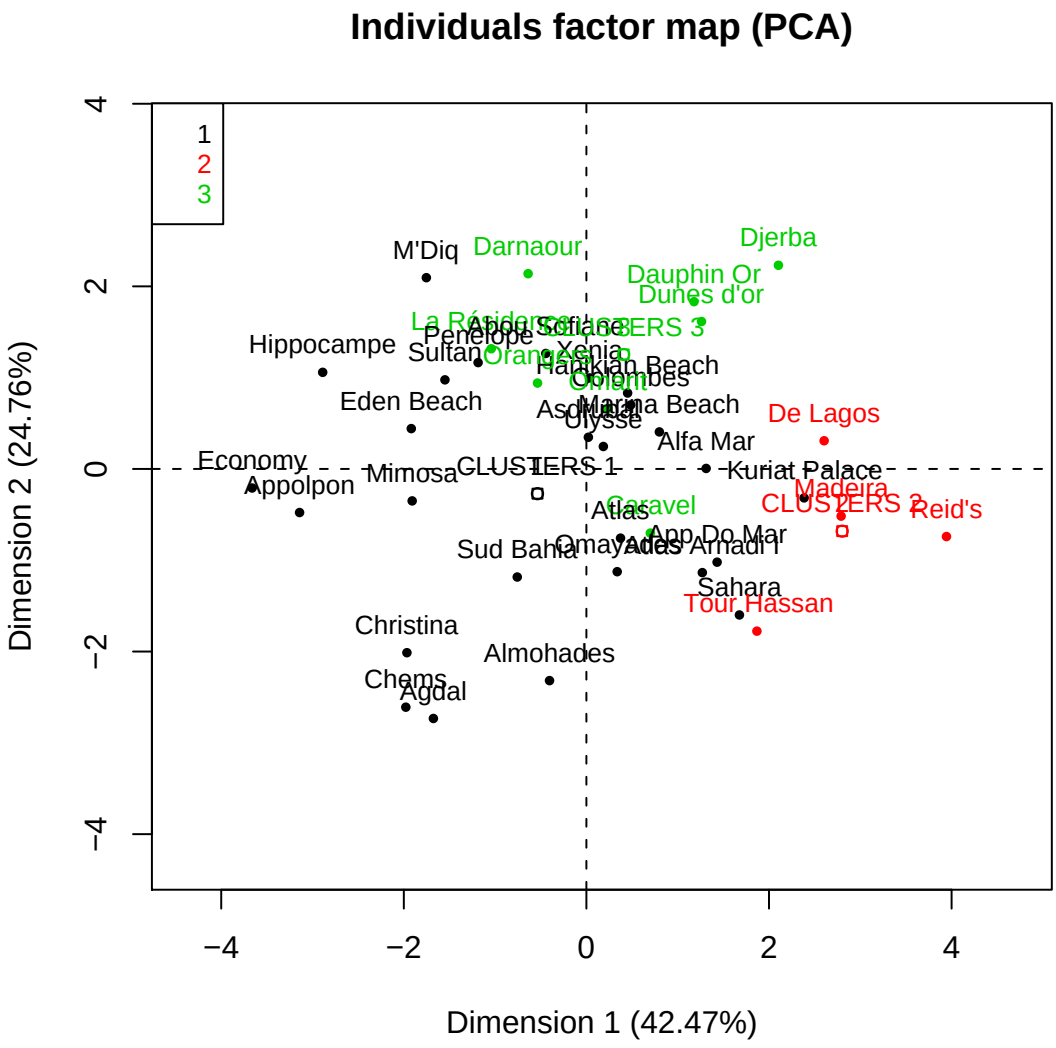

```
> plot(res.pca2, axes = c(3, 4), habillage = 1, new.plot = FALSE,
+     cex = 0.8)
```

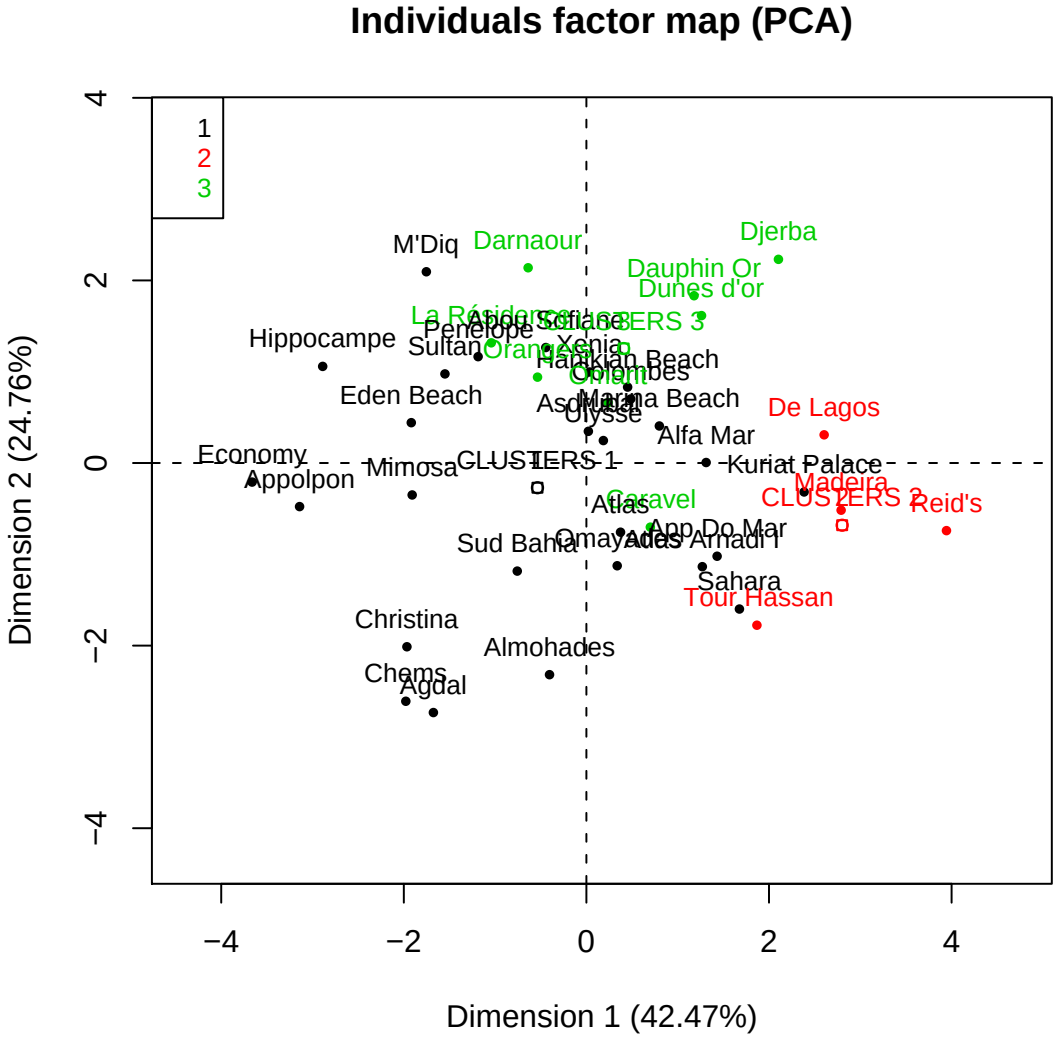


3. Quelles sont les différences de classement entre les deux classements de la question 1. et de la question 2. ? Le premier plan factoriel traduit-il fidèlement l'ensemble des données ? On pourra se référer au diagramme des valeurs propres obtenu au TD 5.

```
> layout(1:2)
> plot(PCA(datas, graph = FALSE, quali.sup = 1, ind.sup = 1:3),
+     habillage = 1, new.plot = FALSE, cex = 0.8)
> plot(PCA(datas2, graph = FALSE, quali.sup = 1), habillage = 1,
+     new.plot = FALSE, cex = 0.8)
> layout(1)
> layout(1:2)
> plot(PCA(datas, graph = FALSE, quali.sup = 1, ind.sup = 1:3),
+     habillage = 1, new.plot = FALSE, cex = 0.8)
```

```
> plot(PCA(datas2, graph = FALSE, quali.sup = 1), habillage = 1,
+     new.plot = FALSE, cex = 0.8)
> layout(1)
```



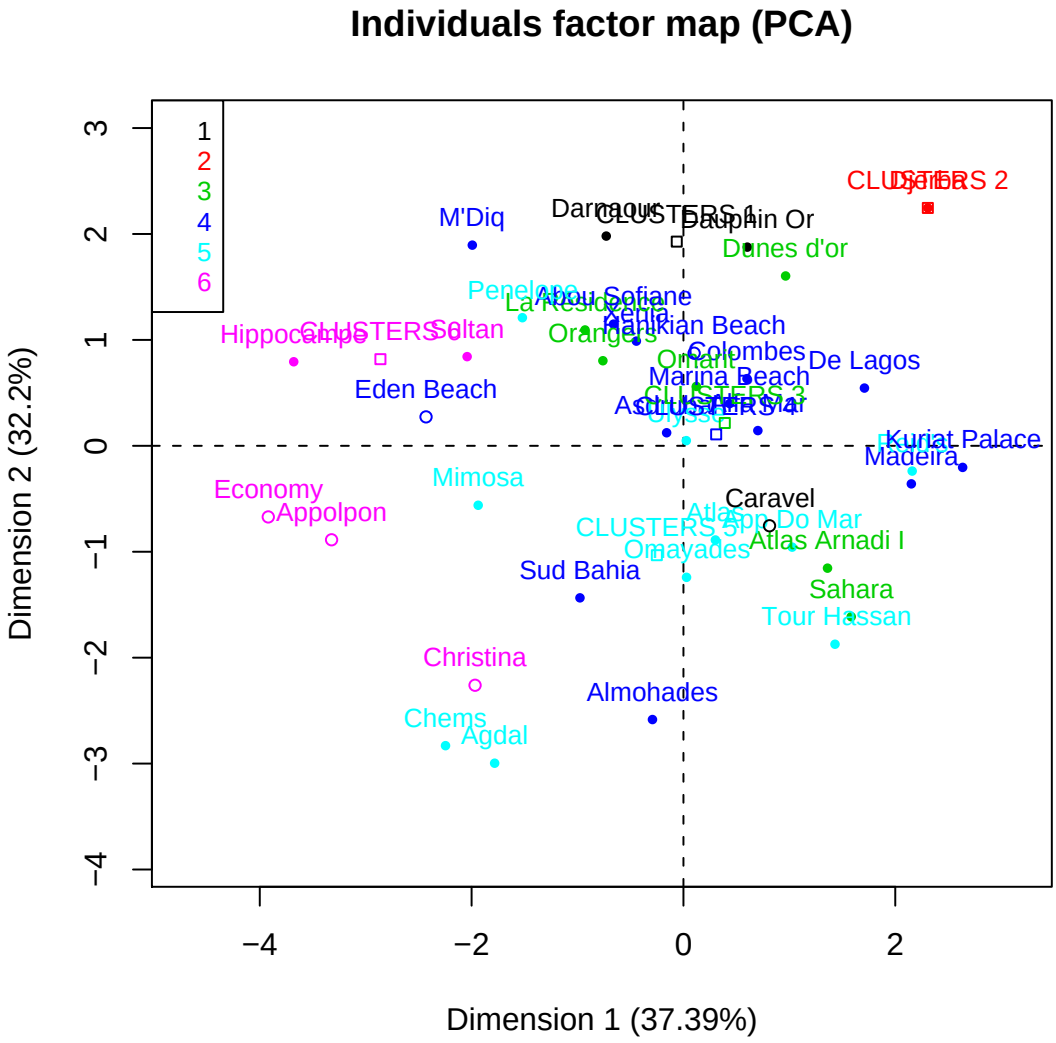


4. On décide de vérifier si l'attribution des étoiles est conforme aux critères de constitution des groupes par la méthode des $K-$moyennes. Puisqu'il existe 6 catégories d'étoiles, de 0 à 5, classer les hôtels en 6 groupes à l'aide de la méthode des $K-$moyennes portant cette fois-ci sur toutes les variables à l'exclusion de la variable prix. Attention les groupes obtenus ne sont pas nécessairement numérotés par ordre croissant des étoiles.

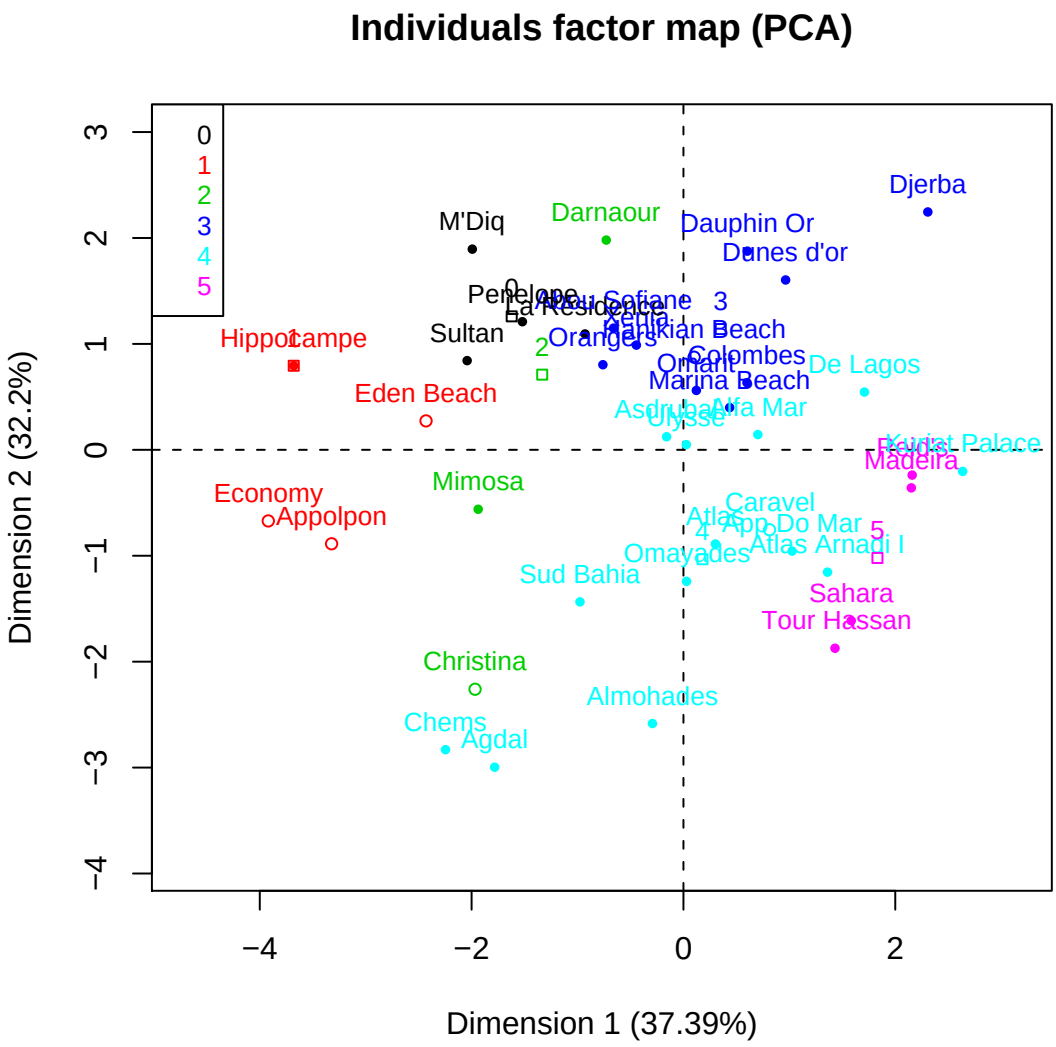
```
> hotelsnum2 <- hotelsnum[, -7]
> clhotel3 <- kmeans(hotelsnum2, 6, nstart = 50)
> colhotnum3 <- cbind(factor(clhotel3$cluster), factor(hotels$ETOILE),
+     hotelsnum2)
> colnames(colhotnum3) <- c("CLUSTERS", "ETOILE_Q", colnames(hotelsnum2))
> datas3 <- colhotnum3
> datas3$CLUSTERS <- factor(datas3$CLUSTERS)
> plot(hotelsnum2, col = colhotnum3$CLUSTERS)
> cbind(clhotel3$cluster, hotels$ETOILE)
```

```
               [,1] [,2]
Appolpon          6    1
Caravel           1    4
Christina         6    2
Economy           6    1
Eden Beach        4    1
Hanikian Beach    4    3
Marina Beach      4    3
Xenia             4    3
Agdal             5    4
Almohades         4    4
Atlas             5    4
Atlas Arnadi I    3    4
Chems             5    4
Dunes d'or        3    3
La Résidence      3    0
M'Diq             4    0
Omayades          5    4
Sahara            3    5
Sud Bahia         4    4
Tour Hassan       5    5
Alfa Mar          4    4
App Do Mar        5    4
De Lagos          4    4
Madeira           4    5
Reid's            5    5
Abou Sofiane      4    3
Asdrubal          4    4
Colombes          4    3
Darnaour          1    2
Djerba            2    3
Mimosa            5    2
Omarit            3    3
Orangers          3    3
Penelope          5    0
Ulysse            5    4
Dauphin Or        1    3
Hippocampe        6    1
Kuriat Palace     4    4
Sultan            6    0
```

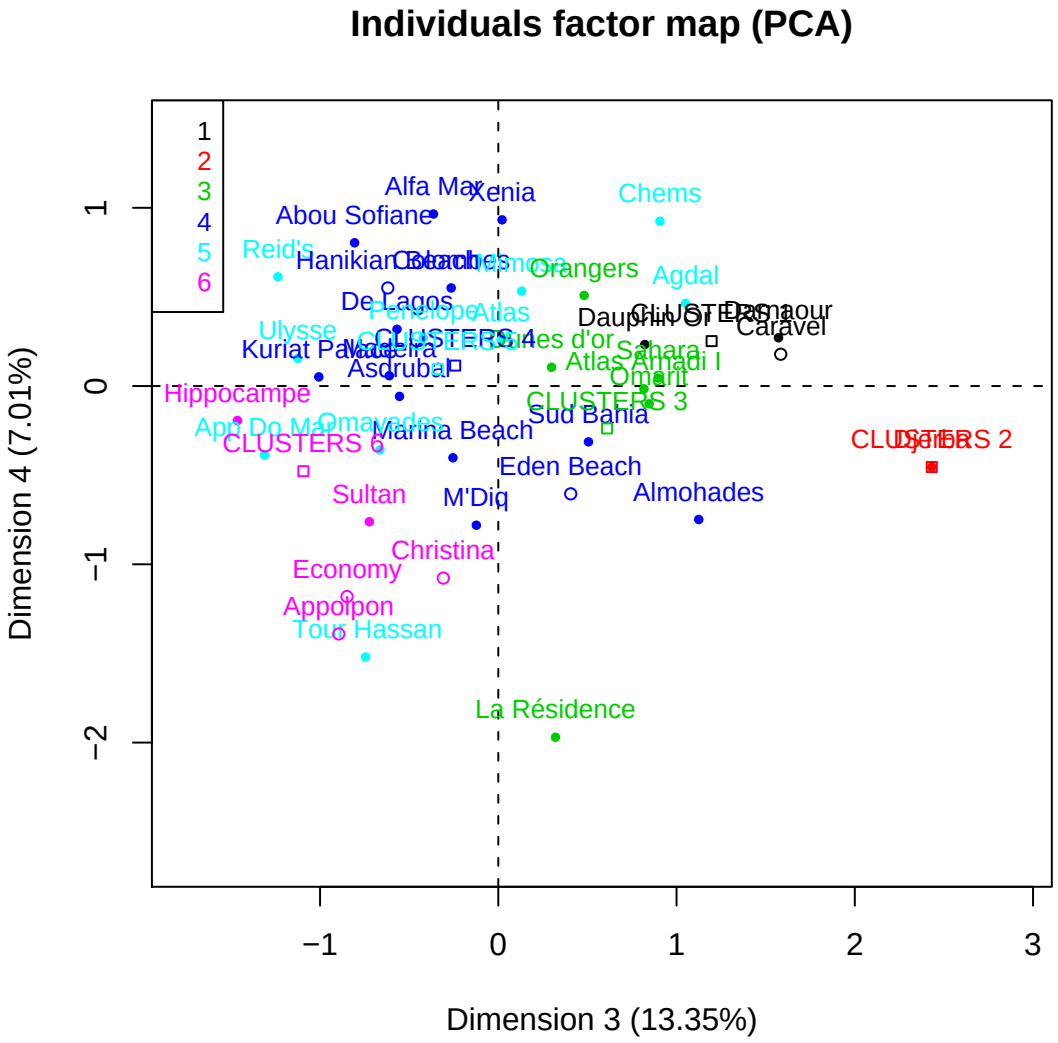
```
> res.pca3 <- PCA(datas3, graph = FALSE, quali.sup = c(1,
+     2), ind.sup = 1:6)
> plot(res.pca3, habillage = 1, new.plot = FALSE, cex = 0.8)
```



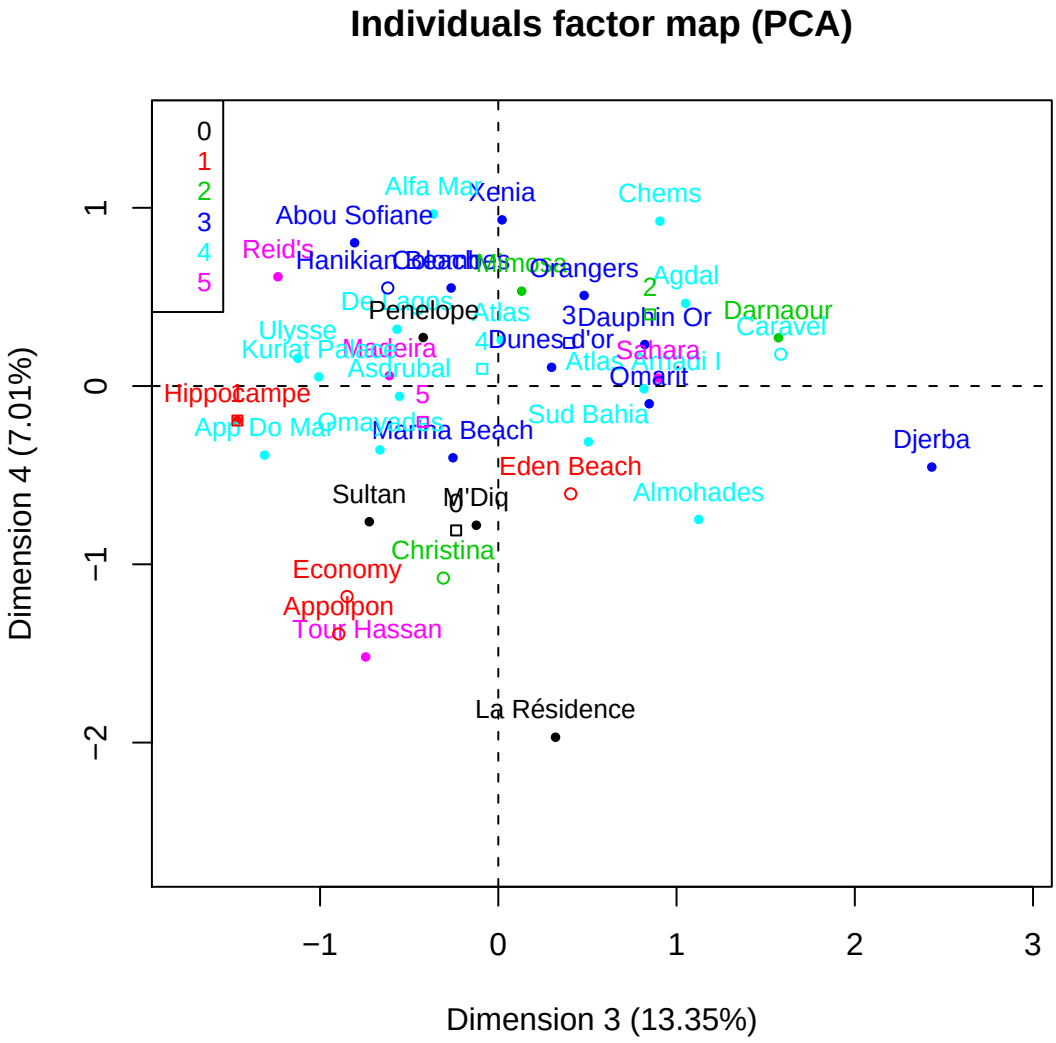

```
> plot(res.pca3, habillage = 2, new.plot = FALSE, cex = 0.8)
```




```
> plot(res.pca3, axes = c(3, 4), habillage = 1, new.plot = FALSE,
+     cex = 0.8)
```




```
> plot(res.pca3, axes = c(3, 4), habillage = 2, new.plot = FALSE,
+     cex = 0.8)
```


Individuals factor map (PCA)
Dimension 4 (7.01%)
Dimension 3 (13.35%)
0
1
2
3
4
5
Alfa Mar
Xenia
Chems
Abou Sofiane
Reid's
Hanikian
Orangers
Agdal
Penelope
Dauphin Or
Darnaour
Ulysse
Caravel
Dunes d'or
Sahara
Asdrubal
Omarit
Hippocampe
Sud Bahia
Djerba
Marina Beach
Eden Beach
Sultan
M'Diq
Almohades
Christina
Economy
Appolpon
Tour Hassan
La Résidence

NUMERO	NOM	PAYS	ETOILE	CONFORT	CHAMBRE	CUISINE	SPORT	PLAGE	PRIX
1	Appolpon	Grèce	1	4	56	2	0	8	390
2	Caravel	Grèce	4	7	471	7	6	5	468
3	Christina	Grèce	2	7	93	3	0	5	427
4	Economy	Grèce	1	3	56	1	0	8	369
5	Eden Beach	Grèce	1	4	286	3	4	7	499
6	Hanikian Beach	Grèce	3	6	282	5	10	10	526
7	Marina Beach	Grèce	3	6	310	7	7	10	587
8	Xenia	Grèce	3	4	300	6	10	8	534
9	Agdal	Maroc	4	5	146	5	1	0	447
10	Almohades	Maroc	4	6	250	8	0	3	482
11	Atlas	Maroc	4	5	196	9	6	6	511
12	Atlas Arnadi I	Maroc	4	7	324	10	6	5	532
13	Chems	Maroc	4	5	138	3	2	0	450
14	Dunes d'or	Maroc	3	4	400	10	10	10	569
15	La Résidence	Maroc	0	5	366	7	4	10	419
16	M'Diq	Maroc	0	3	300	5	7	10	421
17	Omayades	Maroc	4	6	144	7	4	8	579
18	Sahara	Maroc	5	7	330	10	5	5	598
19	Sud Bahia	Maroc	4	5	260	5	2	6	495
20	Tour Hassan	Maroc	5	7	170	10	1	10	730
21	Alfa Mar	Portugal	4	6	254	7	10	8	646
22	App,Do Mar	Portugal	4	8	140	7	6	10	652
23	De Lagos	Portugal	4	6	273	10	10	10	802
24	Madeira	Portugal	5	7	260	10	8	10	761
25	Reid's	Portugal	5	7	169	10	10	10	1101
26	Abou Sofiane	Tunisie	3	4	225	5	10	10	434
27	Asdrubal	Tunisie	4	4	225	7	6	10	489
28	Colombes	Tunisie	3	5	250	9	10	8	436

NUMERO	NOM	PAYS	ETOILE	CONFORT	CHAMBRE	CUISINE	SPORT	PLAGE	PRIX
29	Darnaour	Tunisie	2	3	550	6	9	8	399
30	Djerba	Tunisie	3	6	800	10	10	10	477
31	Mimosa	Tunisie	2	4	150	5	6	4	375
32	Omarit	Tunisie	3	5	425	7	7	8	486
33	Orangers	Tunisie	3	4	366	5	8	8	447
34	Penelope	Tunisie	0	5	200	5	10	7	473
35	Ulysse	Tunisie	4	4	130	8	7	10	495
36	Dauphin Or	Turquie	3	4	500	8	10	10	617
37	Hippocampe	Turquie	1	2	50	1	5	10	489
38	Kuriat Palace	Turquie	4	9	232	10	10	10	520
39	Sultan	Turquie	0	3	110	7	6	8	534

. . . .