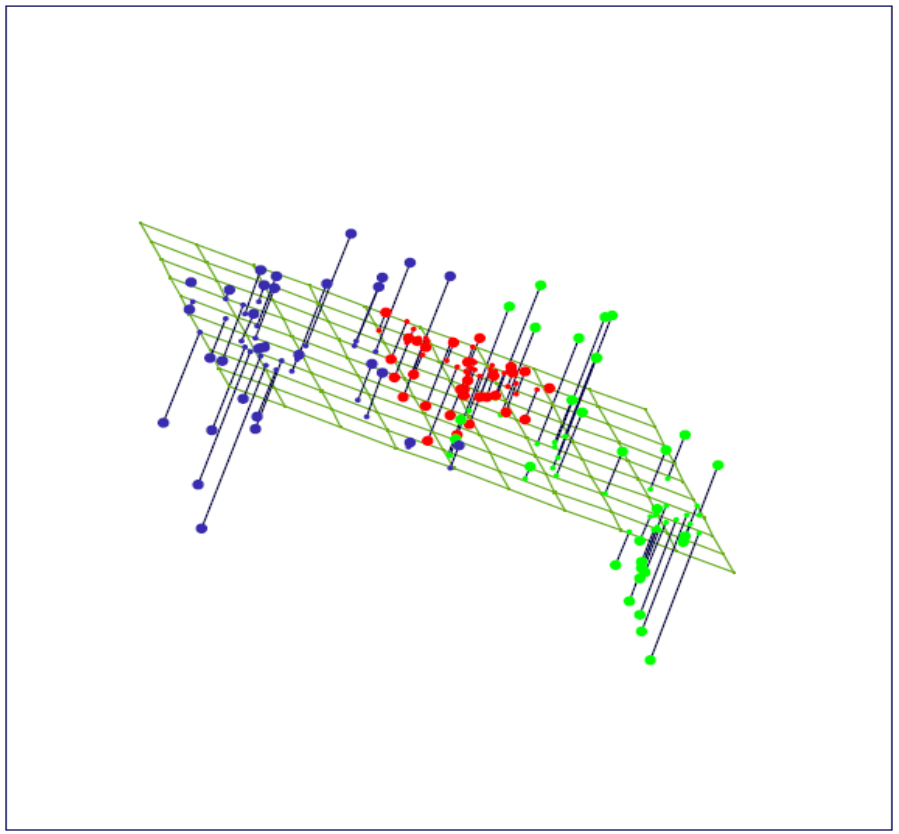
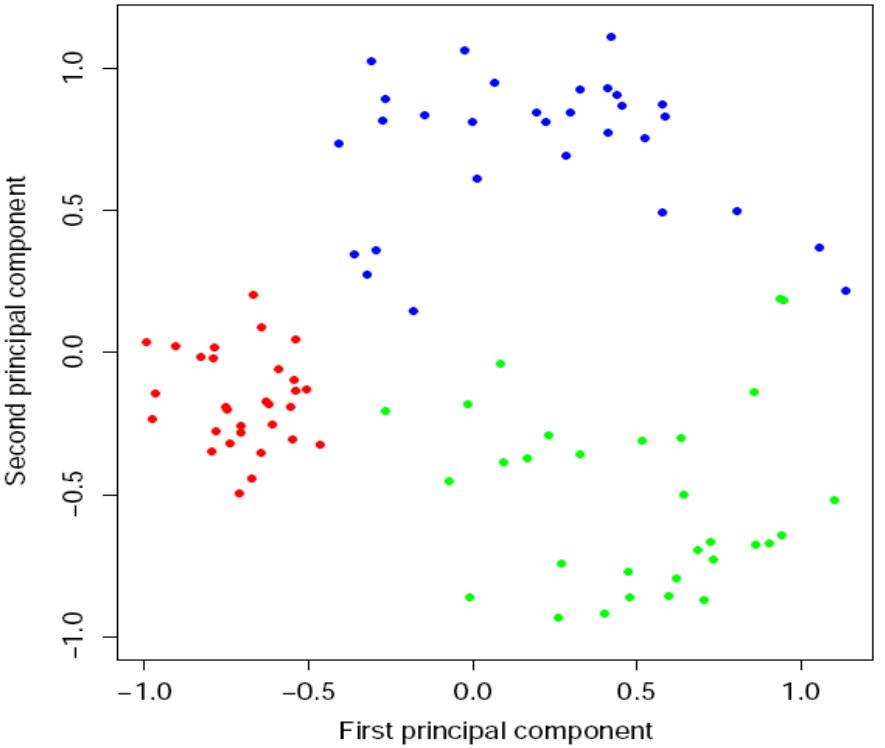
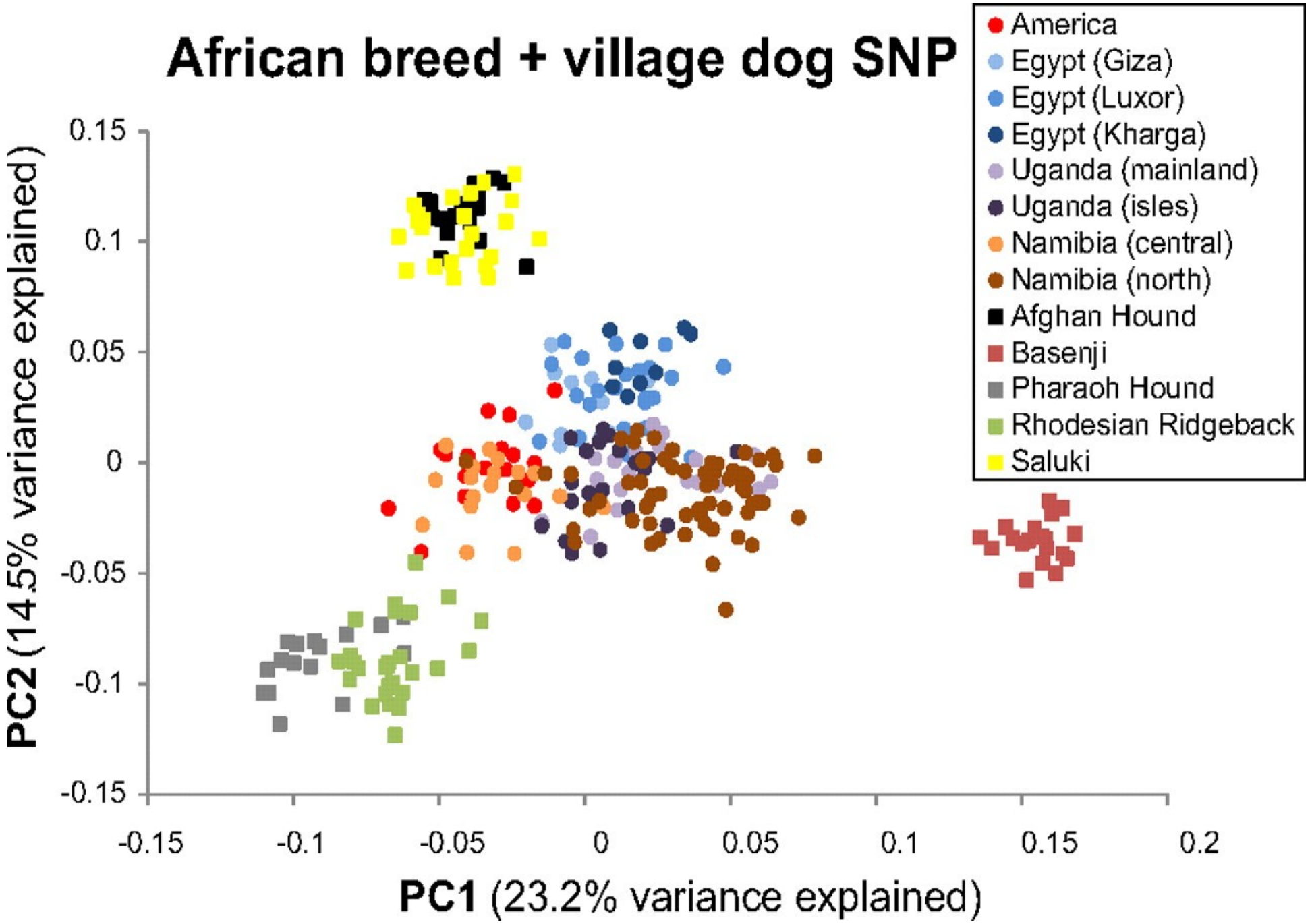
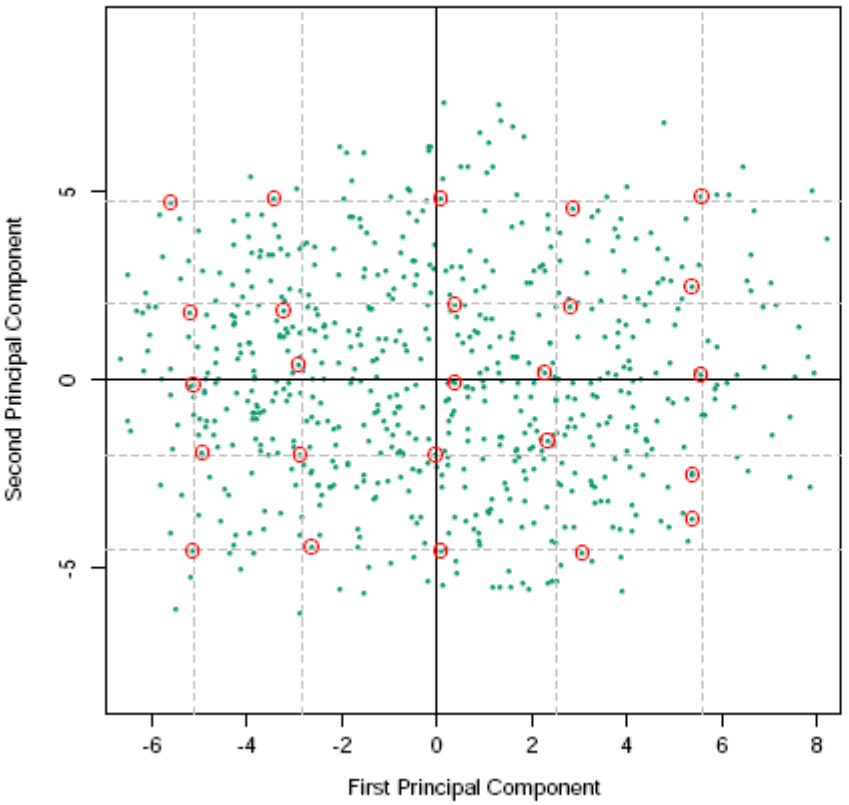
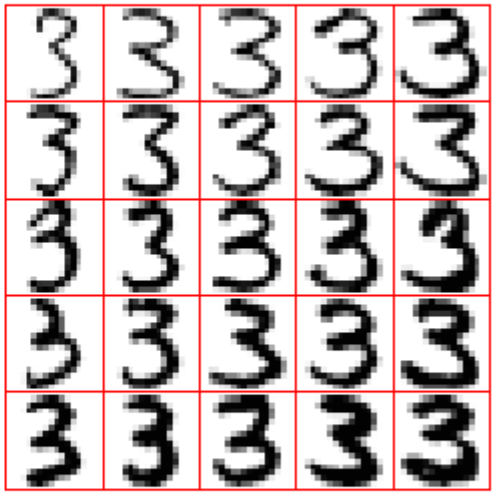



Second principal component
First principal component
1.0
0.5
0.0
−0.5
−1.0
−1.0
−0.5
0.0
0.5
1.0

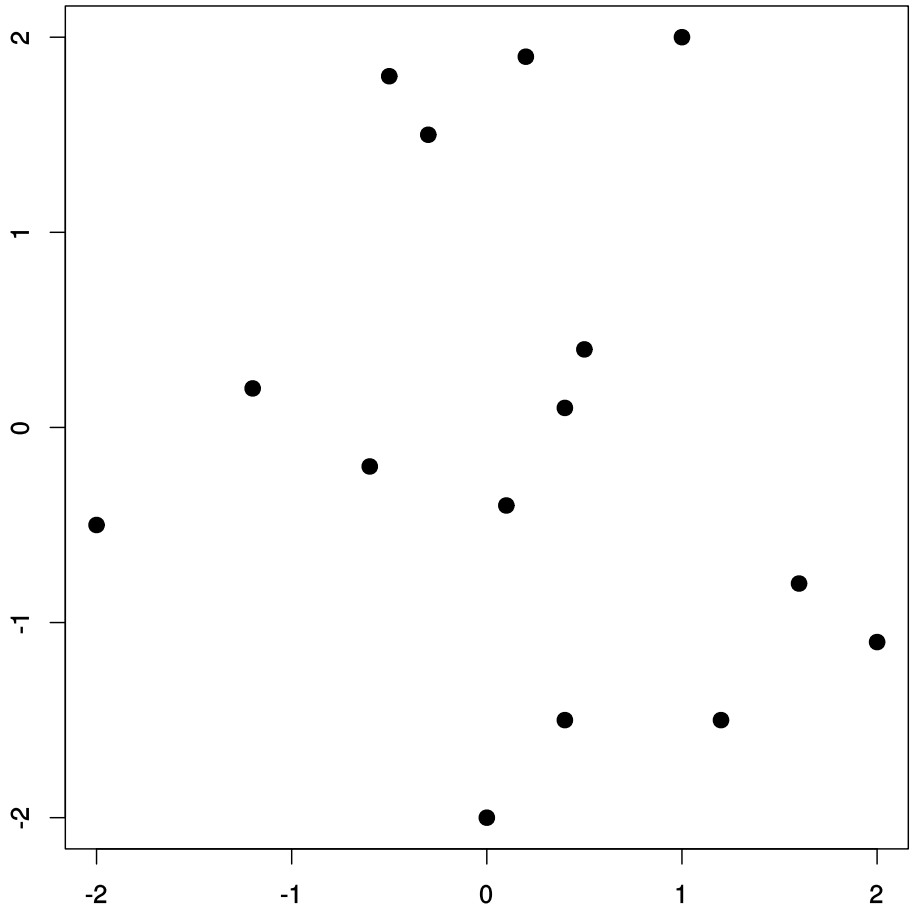

African breed + village dog SNP
America
Egypt (Giza)
Egypt (Luxor)
Egypt (Kharga)
Uganda (mainland)
Uganda (isles)
Namibia (central)
Namibia (north)
Afghan Hound
Basenji
Pharaoh Hound
Rhodesian Ridgeback
Saluki
0.15
0.1
0.05
0
-0.05
-0.1
-0.15
PC2 (14.5% variance explained)
-0.15
-0.1
-0.05
0
0.05
0.1
0.15
0.2
PC1 (23.2% variance explained)


Second Principal Component
5
0
-5
-6
-4
-2
0
2
4
6
8
First Principal Component



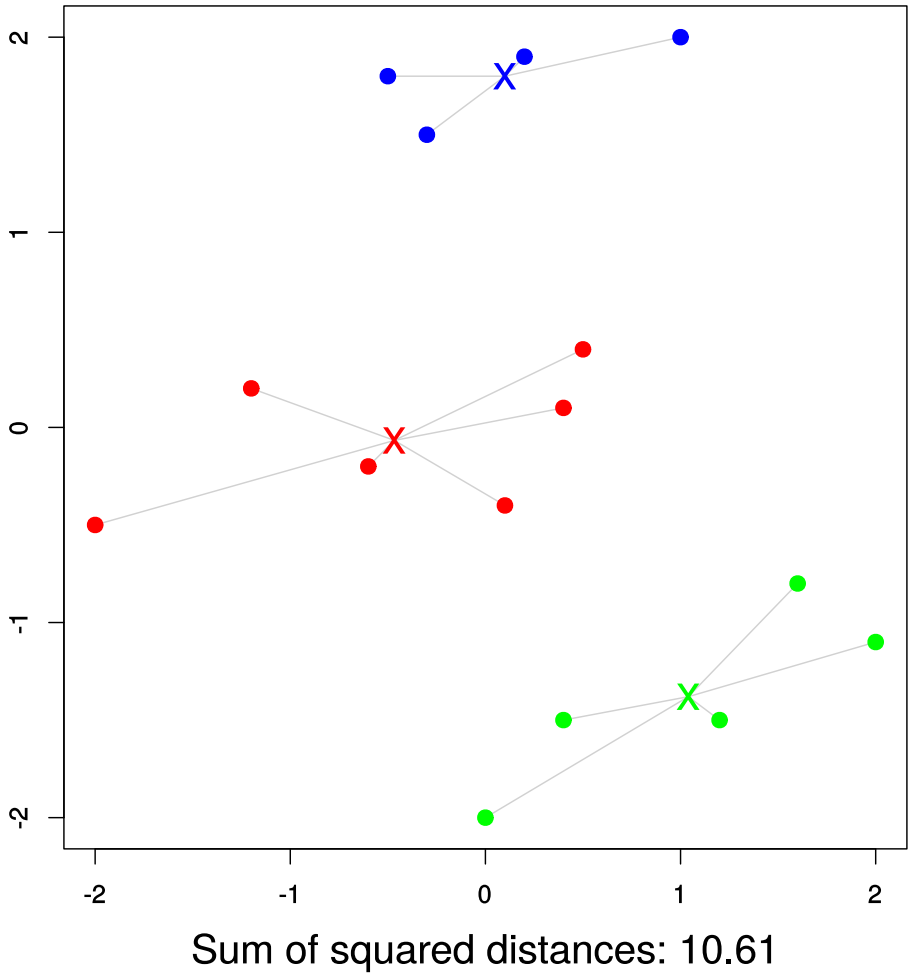
Príklad vstupu

x_1	-2.00	-0.50
x_2	-1.20	0.20
x_3	-0.60	-0.20
x_4	-0.50	1.80
x_5	-0.30	1.50
x_6	0.00	-2.00
x_7	0.10	-0.40
x_8	0.20	1.90
x_9	0.40	0.10
x_{10}	0.40	-1.50
x_{11}	0.50	0.40
x_{12}	1.00	2.00
x_{13}	1.20	-1.50
x_{14}	1.60	-0.80
x_{15}	2.00	-1.10

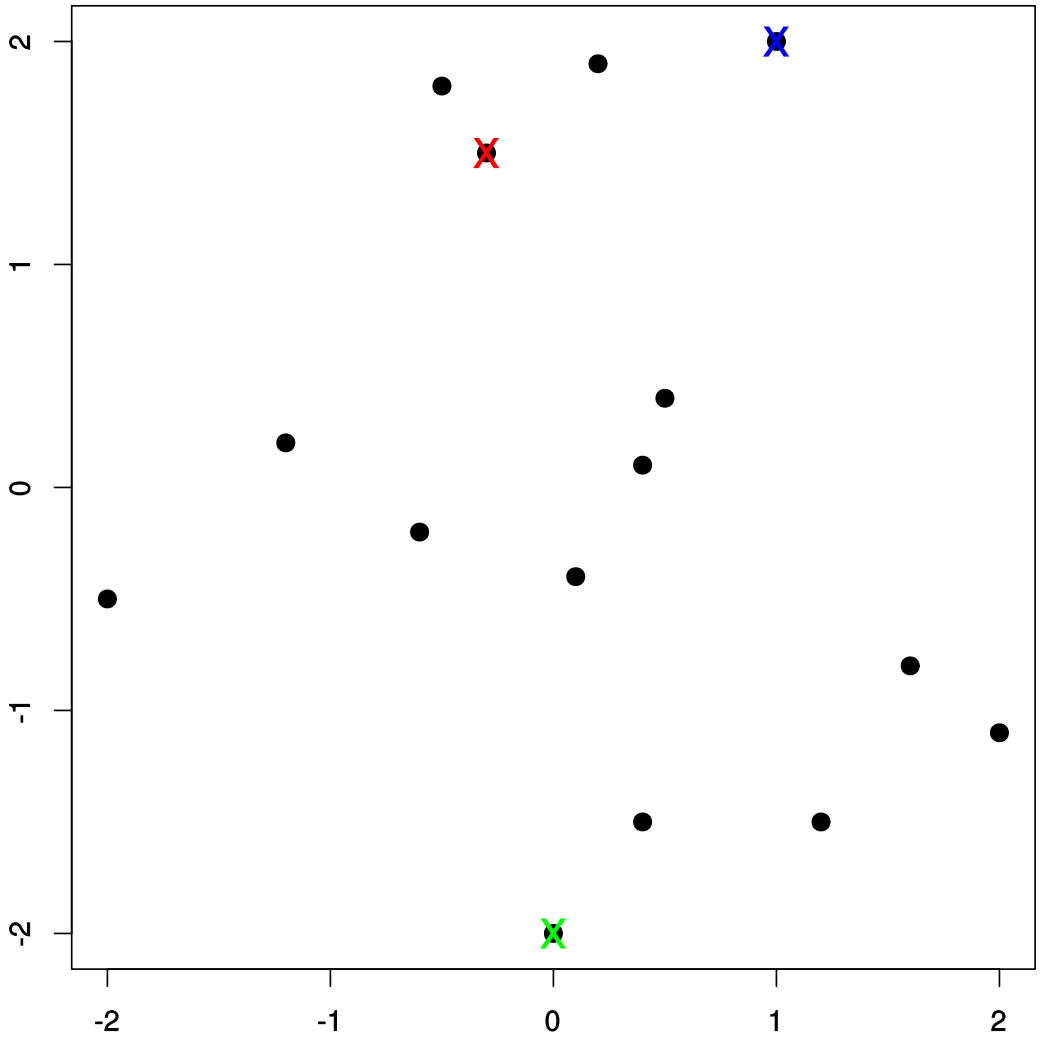


Príklad výstupu

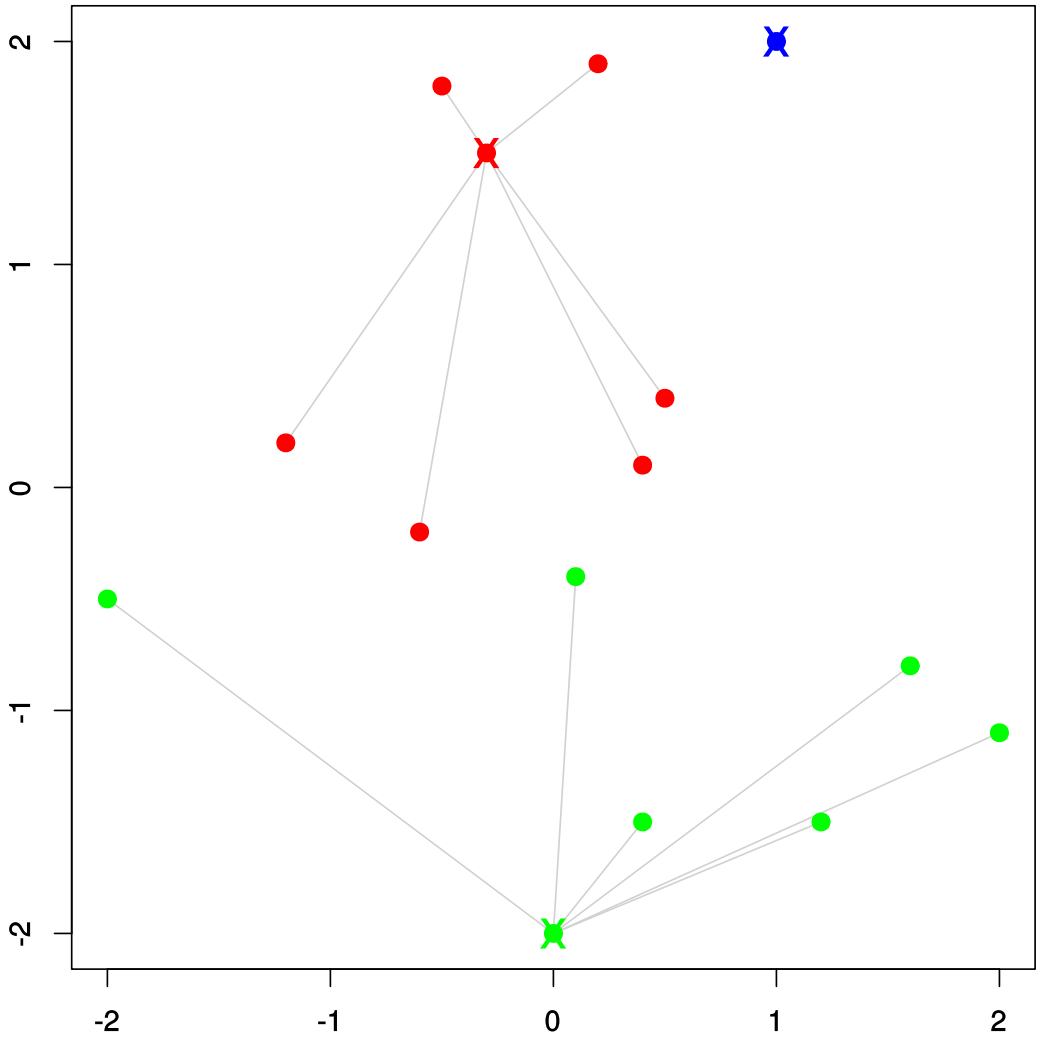
x_1	-2.00	-0.50	**1**
x_2	-1.20	0.20	**1**
x_3	-0.60	-0.20	**1**
x_4	-0.50	1.80	**3**
x_5	-0.30	1.50	**3**
x_6	0.00	-2.00	**2**
x_7	0.10	-0.40	**1**
x_8	0.20	1.90	**3**
x_9	0.40	0.10	**1**
x_{10}	0.40	-1.50	**2**
x_{11}	0.50	0.40	**1**
x_{12}	1.00	2.00	**3**
x_{13}	1.20	-1.50	**2**
x_{14}	1.60	-0.80	**2**
x_{15}	2.00	-1.10	**2**
μ_1	**-0.47**	**-0.07**	
μ_2	**1.04**	**-1.38**	
μ_3	**0.10**	**1.80**	



Zvolíme náhodné centrá μ_i

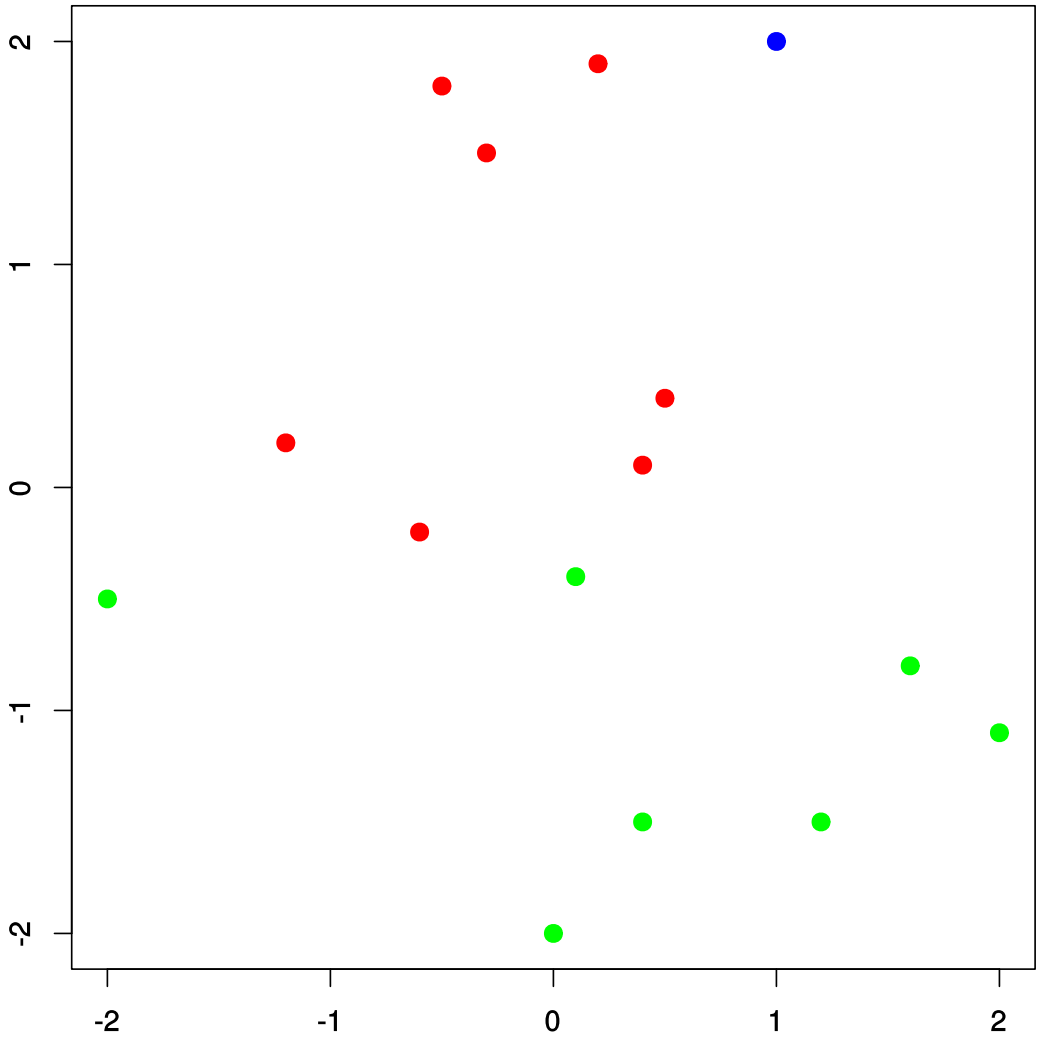


Vektory priradíme do zhlukov (hodnoty c_i)

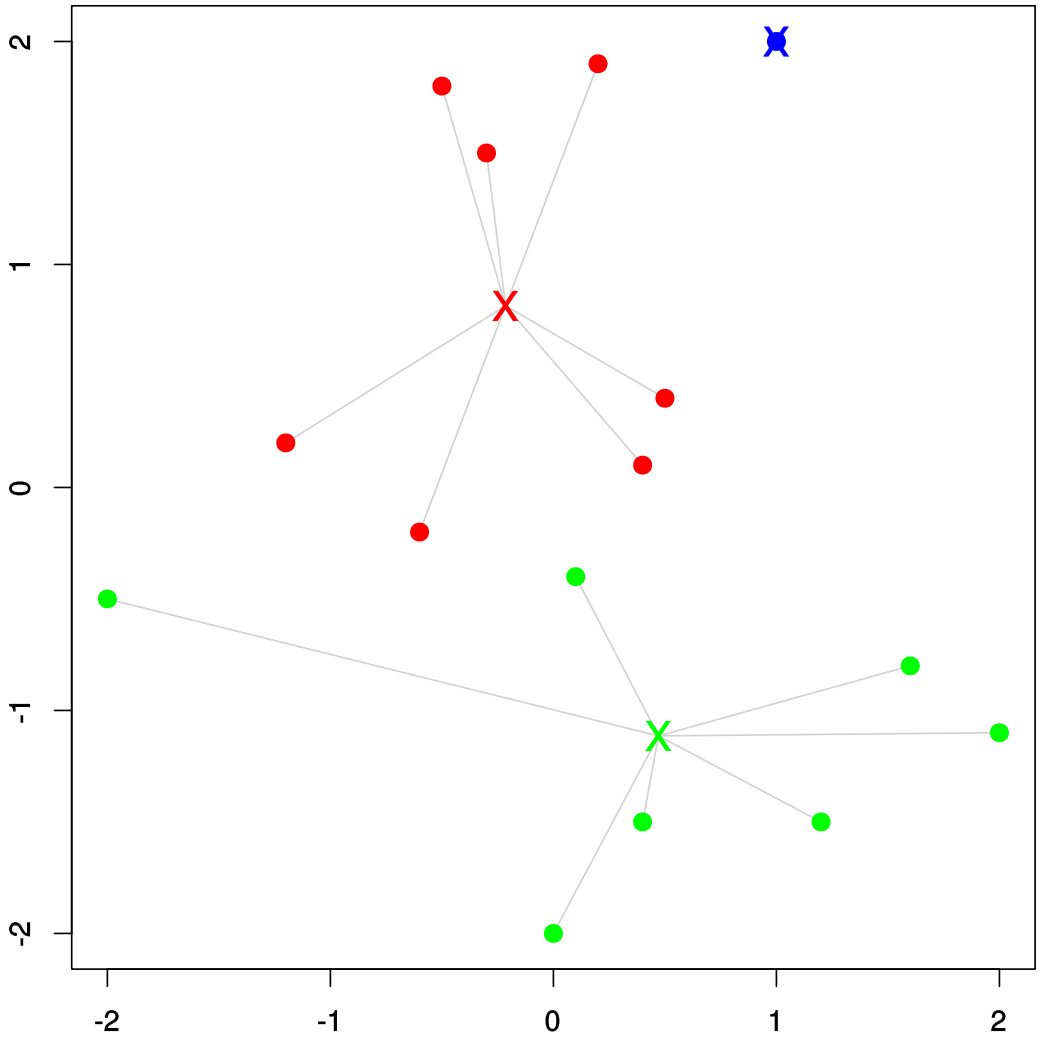


Sum of squared distances: 30.05

Zabudneme μ_i

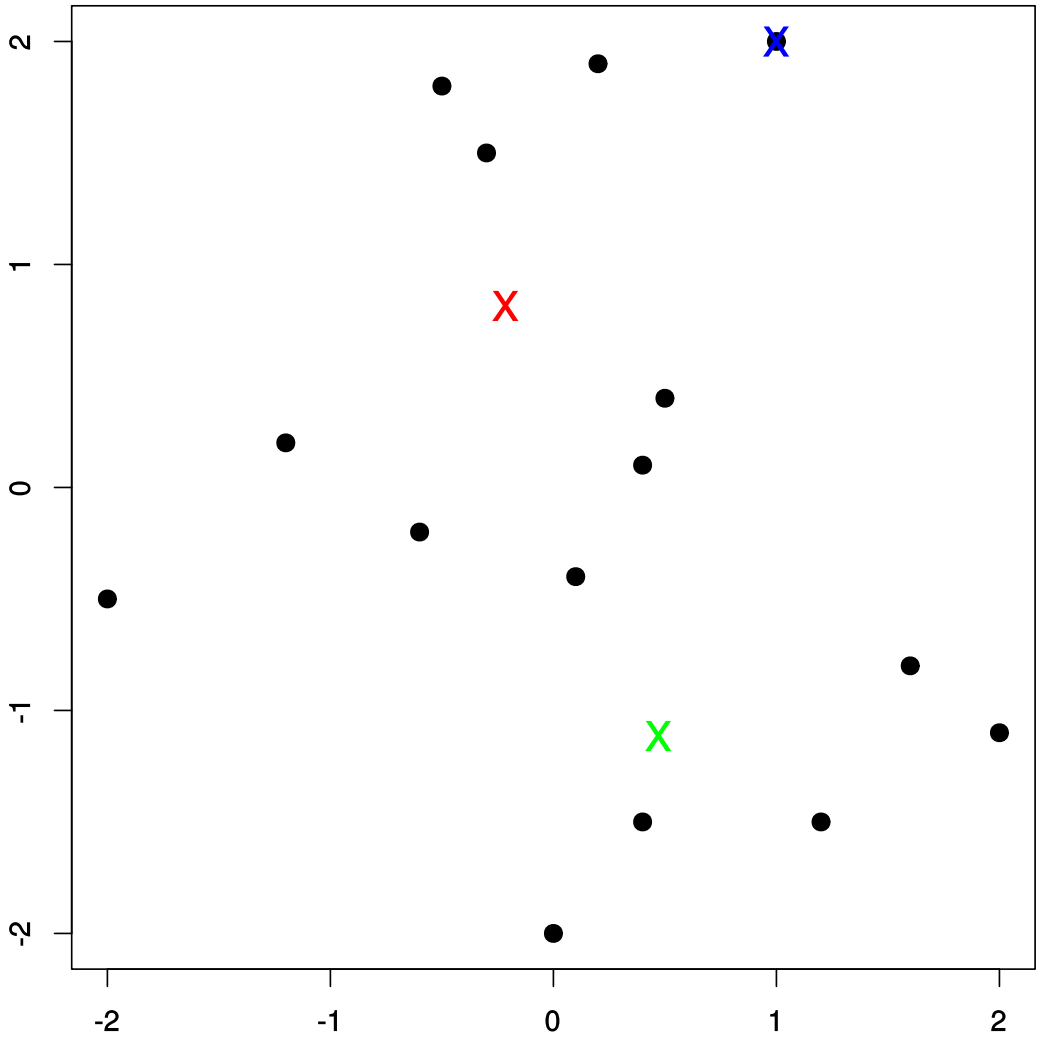


Dopočítame nové μ_i (suma klesla z 30.05 na 19.66)

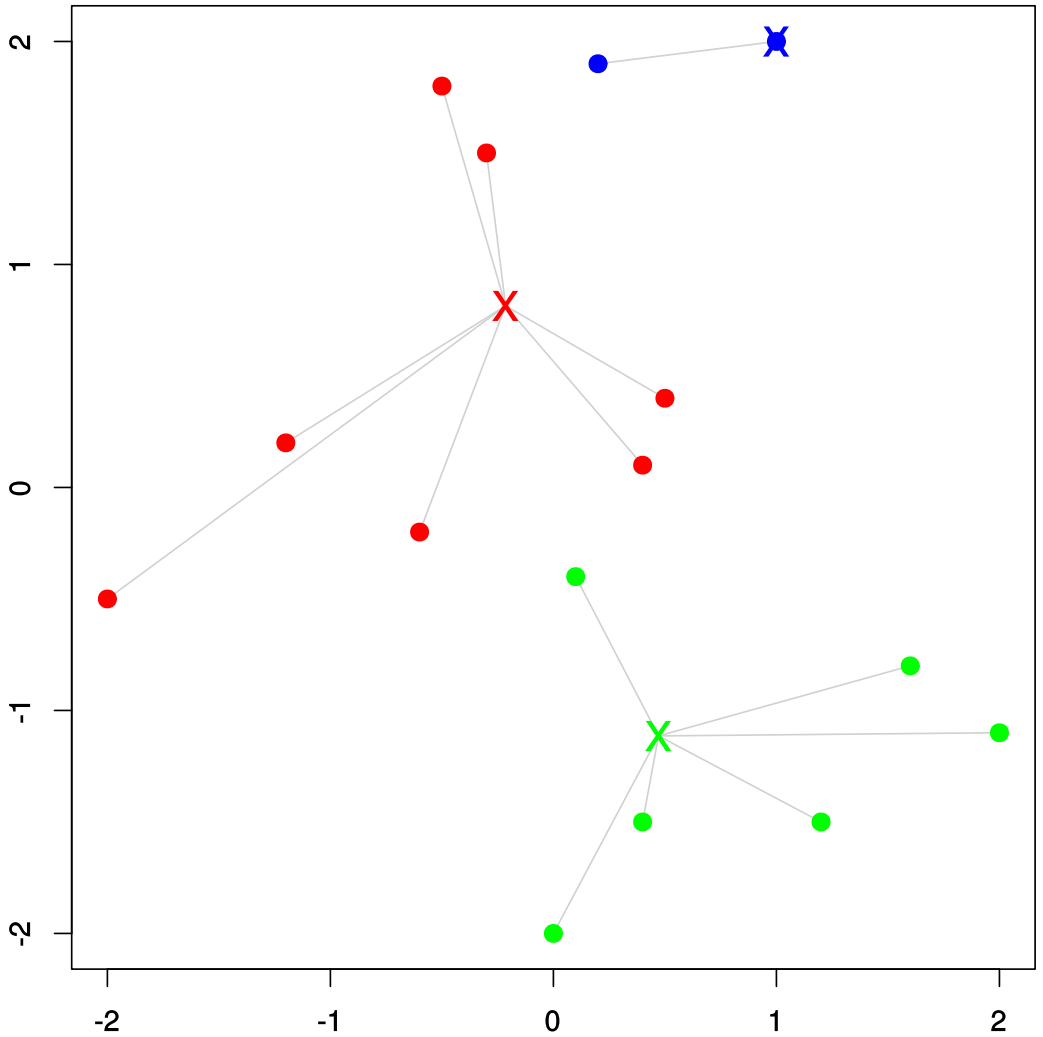


Sum of squared distances: 19.66

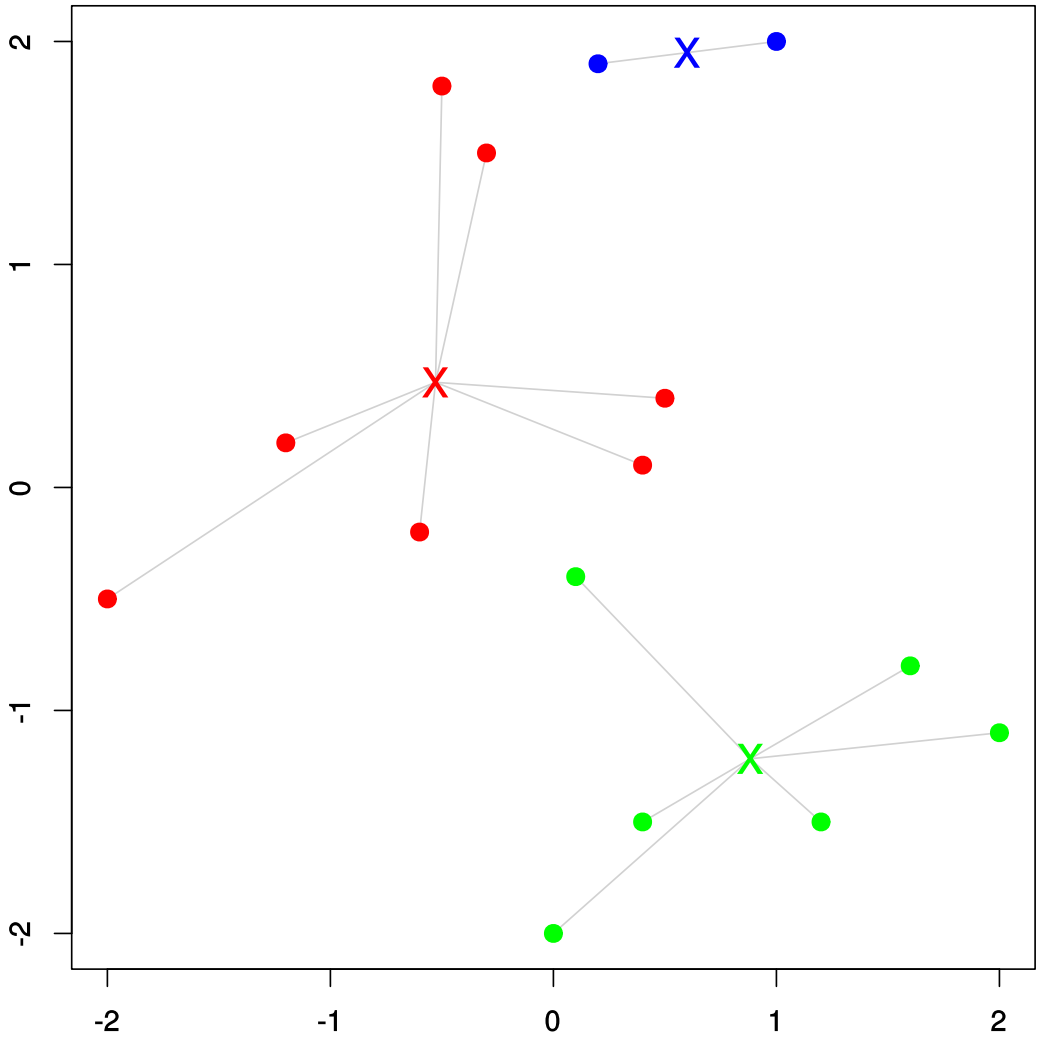
Zabudneme c_i



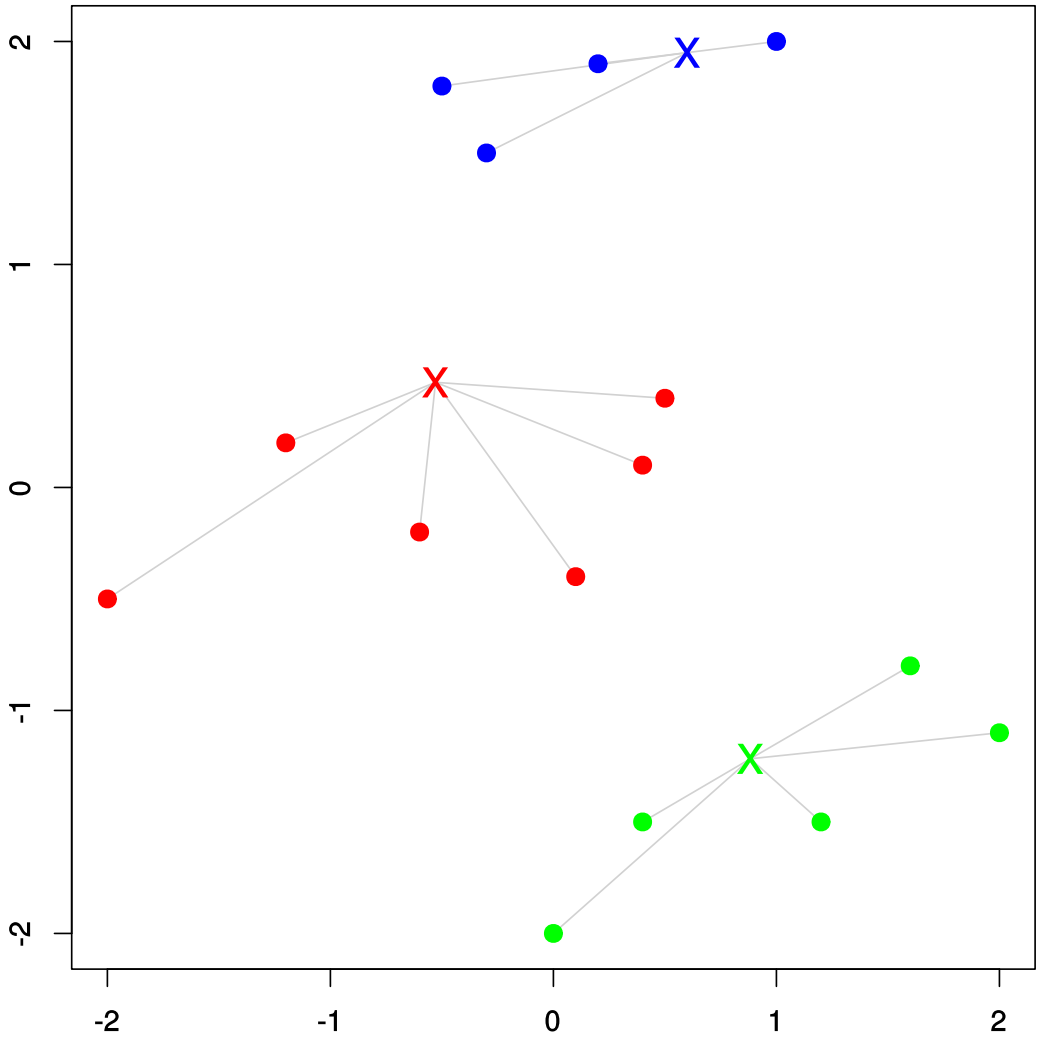
Dopočítame nové c_i (suma klesla z 19.66 na 17.39)



Prepočítame μ_i

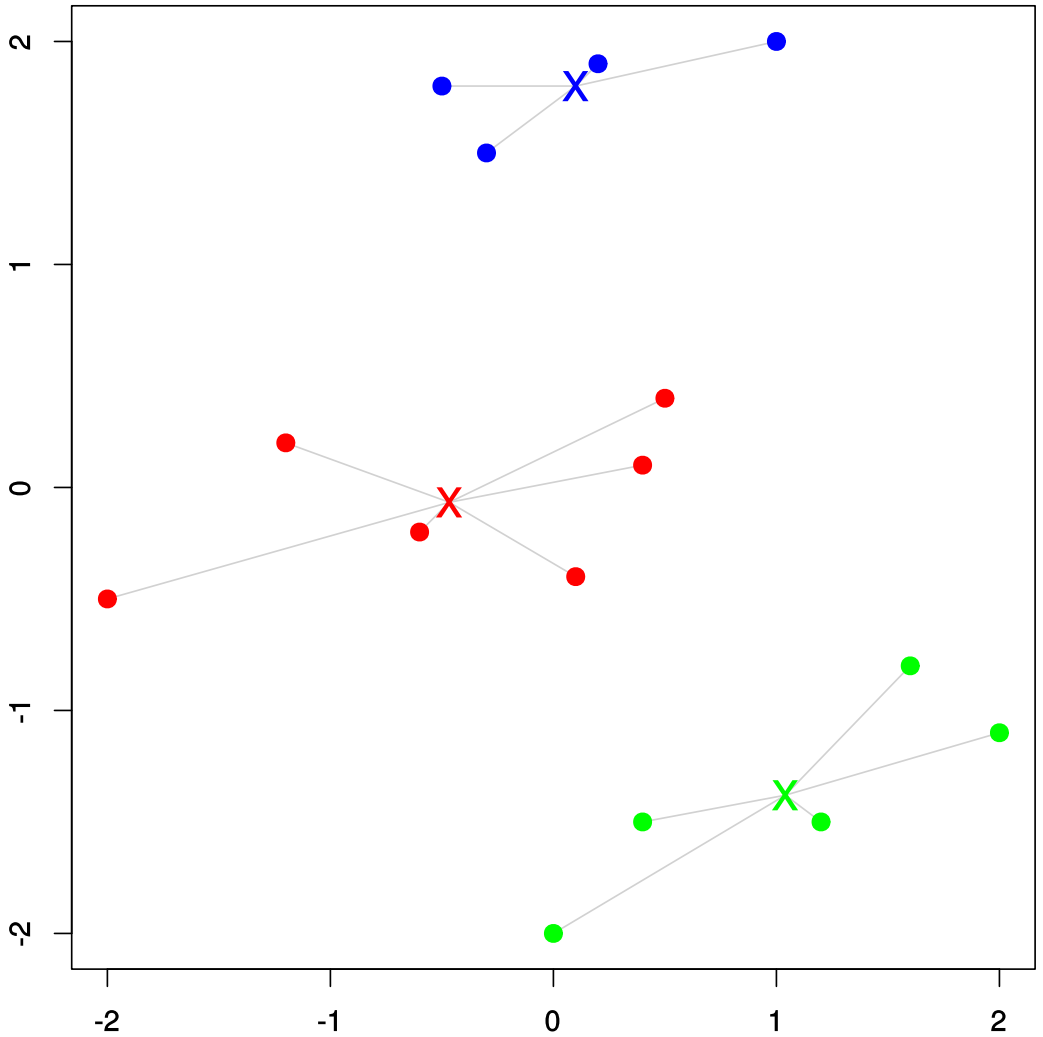


Prepočítame c_i



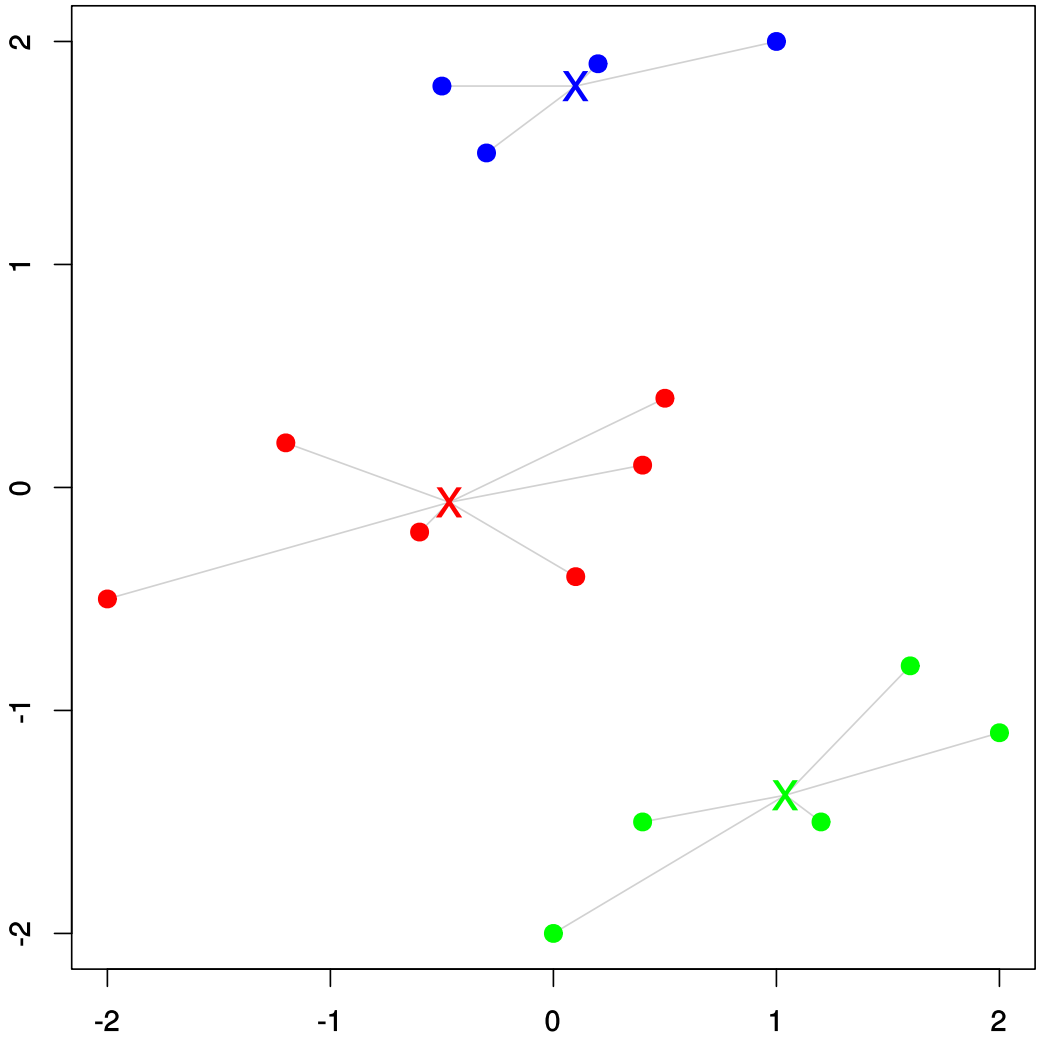
Sum of squared distances: 13.71

Prepočítame μ_i



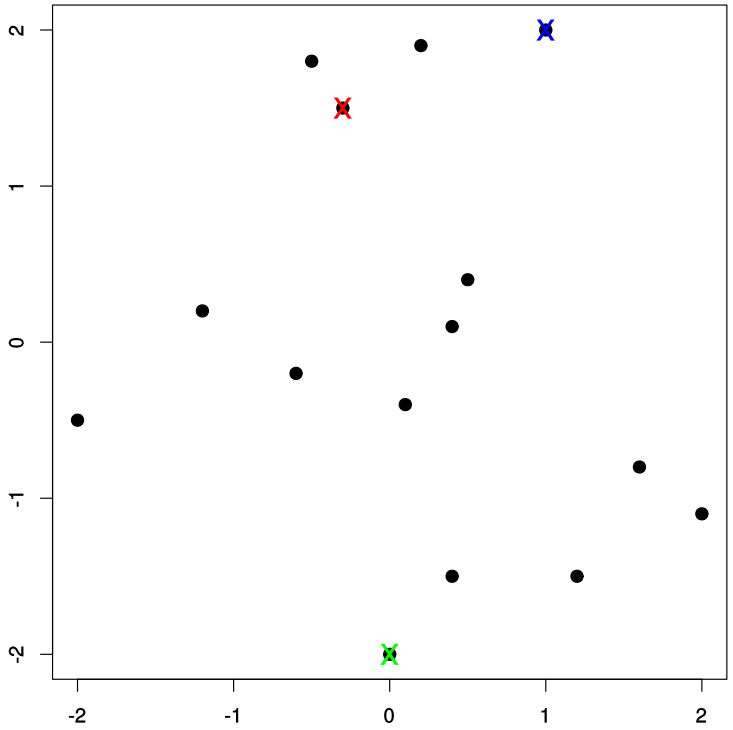
Sum of squared distances: 10.61

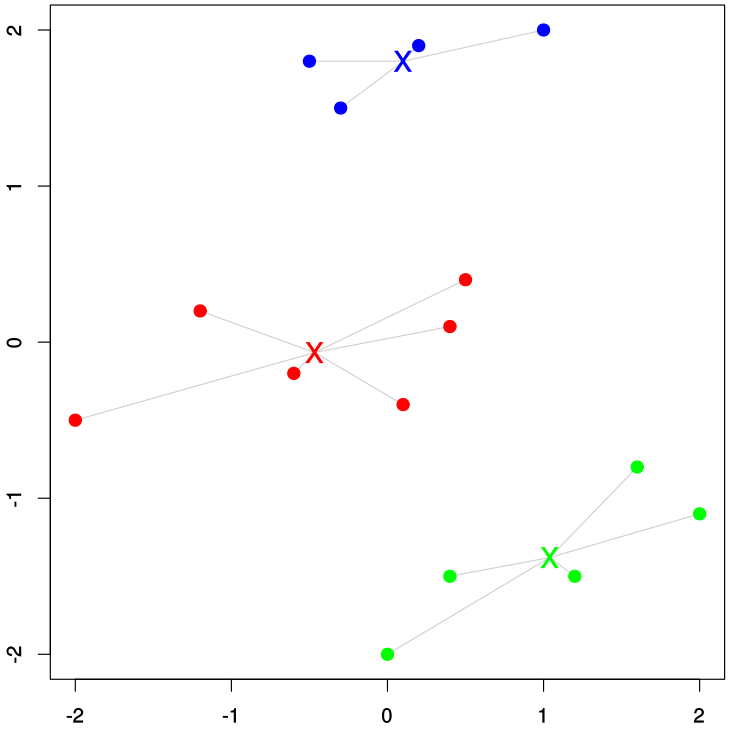
Prepočítame c_i (žiadna zmena, končíme)



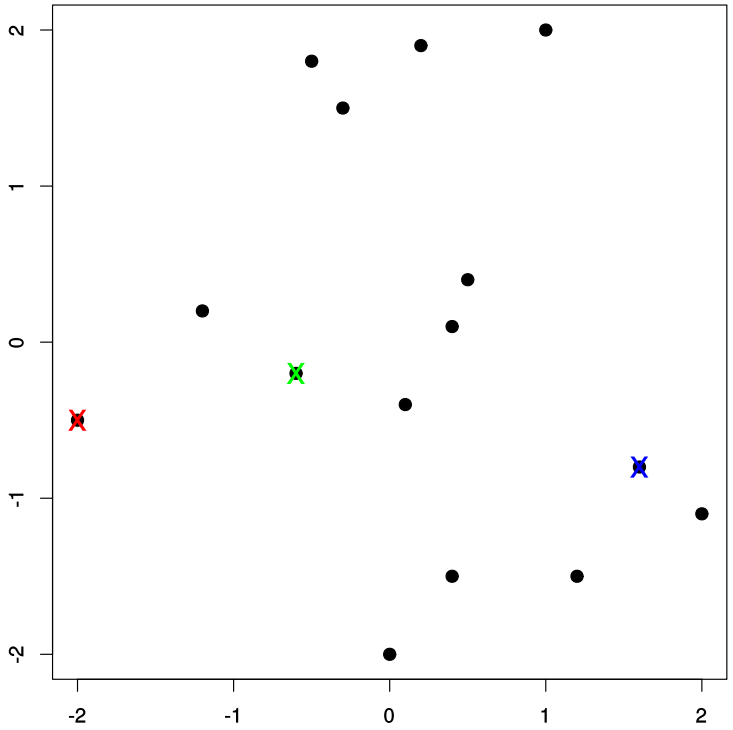
Sum of squared distances: 10.61

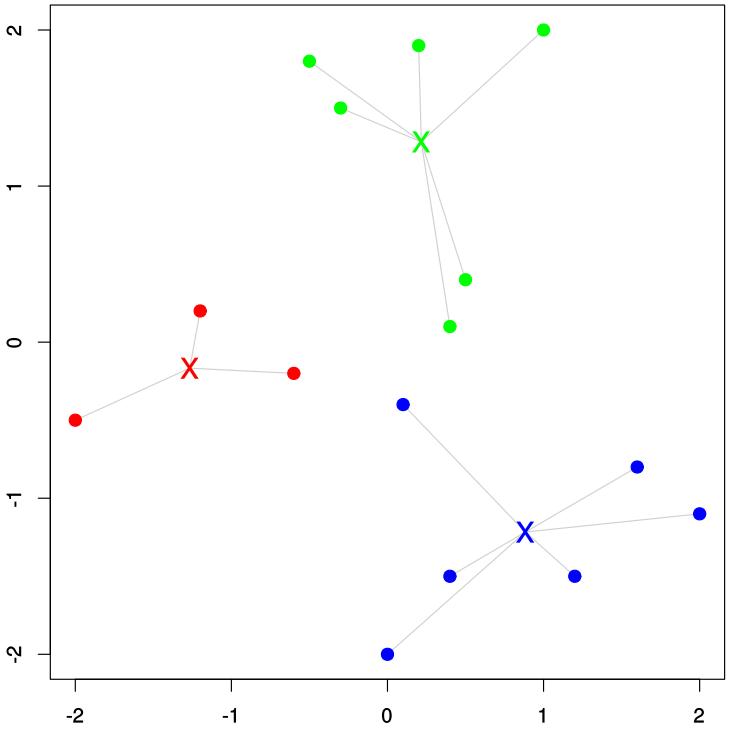
Príklady niekoľkých behov programu





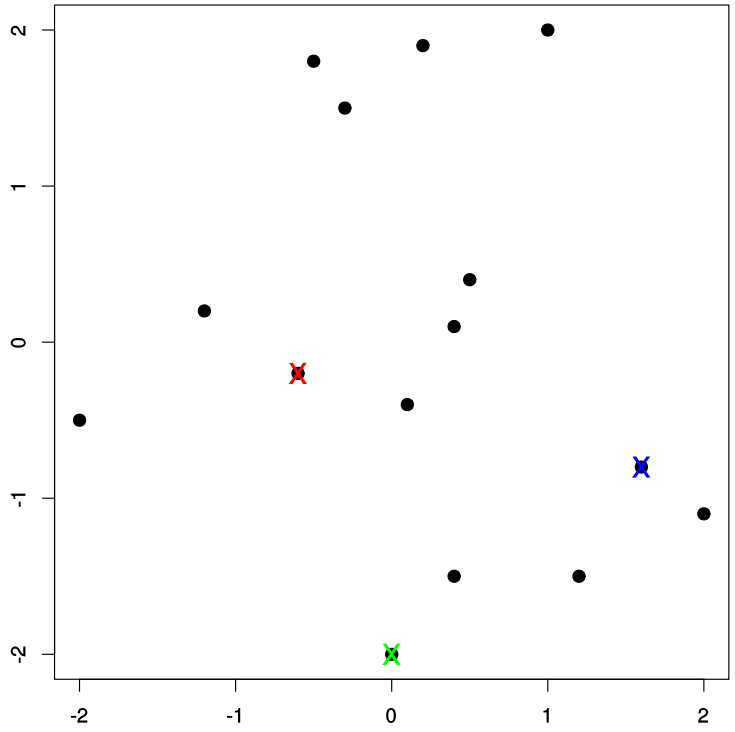
Príklady niekoľkých behov programu

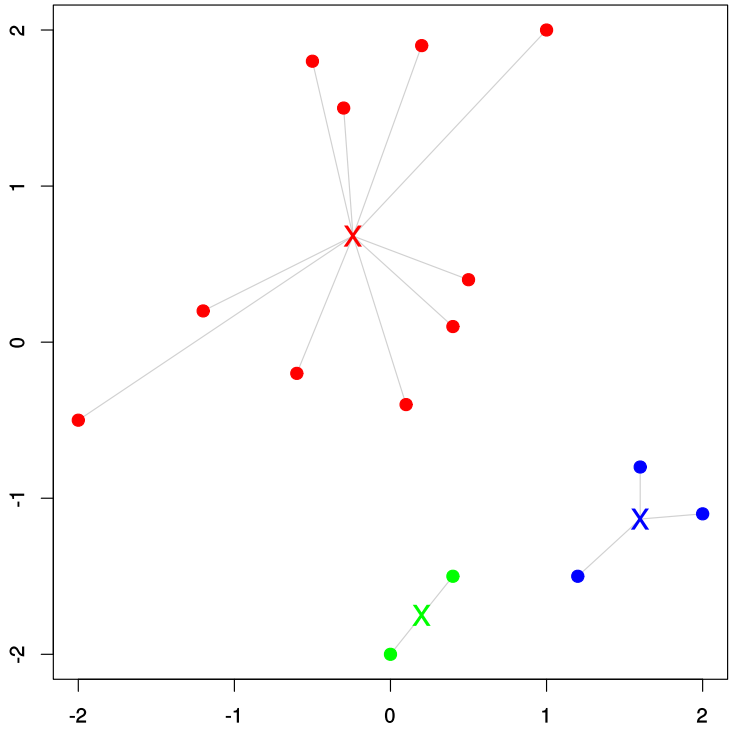




Sum of squared distances: 11.25

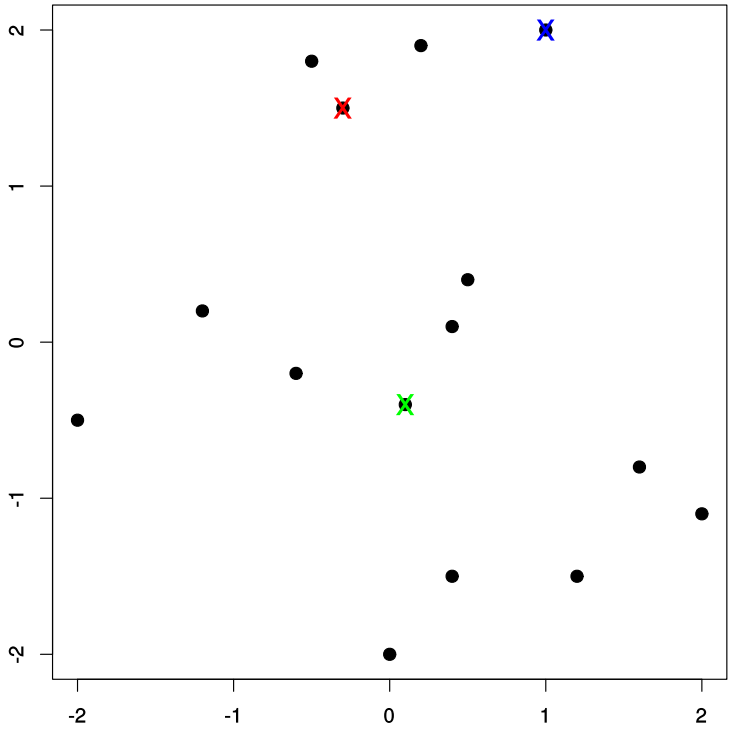
Príklady niekoľkých behov programu

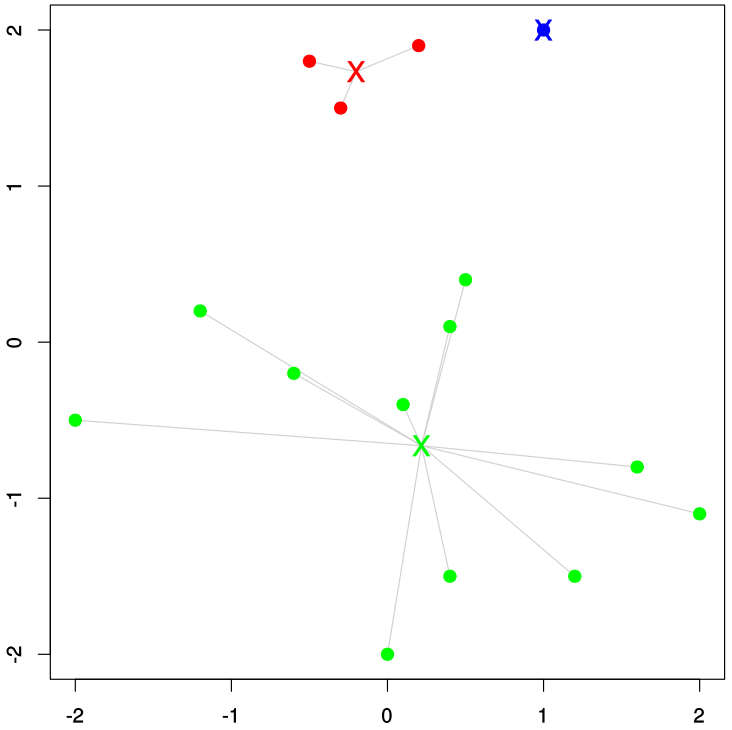




Sum of squared distances: 16.93

Príklady niekoľkých behov programu





Sum of squared distances: 20.37

Zhlukovanie

$K = 2$

$K = 3$

$K = 10$

Original image

Hierarchické zhlukovanie