Je zadaná tabulka s portfolii CP <u>A</u> a <u>B</u> na třech trzích.

Trh	CP	r_i	sigma$_i$	korelace$_{A,B}$	kovariance
I	**A**	0.22	0.3		
	B	0.31	0.32	0.15	0.0144
II	**A**	0.26	0.29		
	B	0.34	0.33	-0.06	-0.00574
III	**A**	0.18	0.2		
	B	0.41	0.38	0.09	0.00684

a) Pro každý trh určete portfolio s minimálním rizikem (tedy vypočít

b) Vypočítejte pro tato portfolia očekávaný výnos **r$_p$**.

c) Určete, na kterém trhu máme nejvýhodněji investovat.

I.	0.18	0.0288	1	0	3.056235
	0.0288	0.2048	1	0	-3.05623
	1	1	0	1	0.537897

	Xa	53.79% rp	26.16%
	Xb	46.21% riziko	23.47%
		-0.11013	0.234659

II.	0.1682	-0.01148	1	0	2.445179
	-0.01148	0.2178	1	0	-2.44518
	1	1	0	1	0.56064

	Xa	56.06% rp	29.51%
	Xb	43.94% riziko	21.13%
		-0.08925	0.211251

III.	0.08	0.01368	1	0	2.928772
	0.01368	0.2888	1	0	-2.92877
	1	1	0	1	0.805764

	Xa	80.58% rp	22.47%
	Xb	19.42% riziko	18.32%
		-0.06712	0.183192

-3.05623	0.537897
3.056235	0.462103
0.462103	-0.11013

0.897	1.115

-2.44518	0.56064
2.445179	0.43936
0.43936	-0.08925

0.716	1.397

-2.92877	0.805764
2.928772	0.194236
0.194236	-0.06712

0.815	1.226

Je zadaná tabulka investičních možností

Firma 1 (A)	Firma 2(B)	Firma 3 (C)		Kovariance	
0.8	0.3	0.6		$\sigma_{1,2}$	-0.1
1.2	0.8	1.1		$\sigma_{1,3}$	-0.5
				$\sigma_{2,3}$	0.3

a) Formulujte a řešte zadanou úlohu s prodejem CP nakrátko Lagrangeovou metodou
b) Řešte předchozí model s předem určenou výnosností 15%
c) Vždy spočítejte výnosnost a riziko sestaveného portfolia

2.88	-0.2	-1	1		0
-0.2	1.28	0.6	1		0
-1	0.6	2.42	1		0
1	1	1	0		1

0.332139	rp	0.552452
0.379918		
0.287943	sigmap	0.54435
-0.59263		

2.88	-0.2	-1	1	0.8	0
-0.2	1.28	0.6	1	0.3	0
-1	0.6	2.42	1	0.6	0
1	1	1	0	0	1
0.8	0.3	0.6	0	0	0.15

-0.15092	rp	0.15
1.399384		
-0.24846	sigmap	1.075602
-2.95536		
4.276797		

0.8
0.3
0.6

0.219576	-0.23012	0.01054	0.332139
-0.23012	0.641161	-0.41105	0.379918
0.01054	-0.41105	0.400506	0.287943
0.332139	0.379918	0.287943	-0.59263

0.084002	0.056001	-0.14	-0.33097	1.200299
0.056001	0.037334	-0.09334	1.779354	-2.53313
-0.14	-0.09334	0.23334	-0.44839	1.332836
-0.33097	1.779354	-0.44839	-3.83598	5.870823
1.200299	-2.53313	1.332836	5.870823	-10.6268

Emise	CP1	CP2	CP3	CP4	CP5	CP6
CP1	80.5	82.7	85.3	85.1	123.9	22
CP2		184.7	131.5	69.4	49.5	58
CP3			374.2	384.5	366.5	103.8
CP4				684.8	599.1	51.6
CP5					871.4	-21.2
CP6						89.7
CP7						

a) Vypočítejte podíly cenných papírů v portfoliu, je-li povolen sell short, při minimalizaci

b) Očekávaná výnosnost portfolia nechť je 5%

161	165.4	170.6	170.2	247.8	44
165.4	369.4	263	138.8	99	116
170.6	263	748.4	769	733	207.6
170.2	138.8	769	1369.6	1198.2	103.2
247.8	99	733	1198.2	1742.8	-42.4
44	116	207.6	103.2	-42.4	179.4
7	-19.8	687	1005.4	1040.8	148.8
1	1	1	1	1	1
1.9	6.1	2.9	4	5.7	3.4

0.077542	-0.0061867	0.008788	-0.0097099	-0.0376875	-0.07775
-0.006187	0.0078031	-0.003617	0.0001675	0.0010562	-0.00048
0.008788	-0.0036167	0.007544	-0.0022863	-0.004259	-0.00879
-0.00971	0.0001675	-0.002286	0.00427804	0.0040718	0.01066
-0.037687	0.00105621	-0.004259	0.00407177	0.0205801	0.040175
-0.077748	-0.0004777	-0.008794	0.01066041	0.0401746	0.086382
0.045002	0.00125426	0.002623	-0.0071816	-0.0239362	-0.0502
2.1372	0.04443472	-0.290669	-0.2302728	-0.7733259	-1.1224

váhy v portfoliu

CP1	2.1372
CP2	0.044435
CP3	-0.290669
CP4	-0.230273
CP5	-0.773326
CP6	-1.122403
CP7	1.235036
	-30.28748

výnosnost	0.39525
riziko	3.891496

0.016039	0.00766061	-0.004068	-0.0031513	-0.009141	-0.02351
0.007661	0.00468536	-0.000722	-0.0013092	-0.005371	-0.01269
-0.004068	-0.000722	0.004856	-0.0009153	0.0017085	0.002544
-0.003151	-0.0013092	-0.000915	0.00357866	0.0010276	0.004877
-0.009141	-0.005371	0.001708	0.00102763	0.0073302	0.015
-0.02351	-0.0126894	0.002544	0.00487657	0.015	0.038551
0.016171	0.00774558	-0.003404	-0.0041071	-0.0105543	-0.02477
2.286871	0.01073623	-0.259381	-0.2462335	-0.8427958	-1.2544
-0.378674	0.08525869	-0.07916	0.04038106	0.1757621	0.333946

	váhy v portfoliu		výnosnost	5
CP1	0.3935		riziko	6.313646
CP2	0.43703			
CP3	-0.655179			
CP4	-0.044328			
CP5	0.036015			
CP6	0.415334			
CP7	0.417629			
	-26.04407			
	-10.73604			

CP7	ri %
3.5	1.9
-9.9	6.1
343.5	2.9
502.7	4
520.4	5.7
74.4	3.4
574.6	4.9

i rizika

7	1	1.9	0
-19.8	1	6.1	0
687	1	2.9	0
1005.4	1	4	0
1040.8	1	5.7	0
148.8	1	3.4	0
1149.2	1	4.9	0
1	0	0	1
4.9	0	0	5

0.0450019	2.1371998		1	0	0	0	0	0
0.0012543	0.0444347		0	1	0	0	0	0
0.0026234	-0.290669		0	0	1	0	0	0
-0.0071816	-0.230273		0	0	0	1	0	0
-0.0239362	-0.773326		0	0	0	0	1	0
-0.0501974	-1.122403		0	0	0	0	0	1
0.0324357	1.2350364		0	0	0	0	0	0
1.2350364	-30.28748		0	0	0	0	0	0

1946.5608	-670.6569
	-15.0909
	-1245.669

0.0161709	2.2868707	-0.37867	1	0	0	0	0	0
0.0077456	0.0107362	0.085259	0	1	0	0	0	0
-0.0034036	-0.259381	-0.07916	0	0	1	0	0	0
-0.0041071	-0.246233	0.040381	0	0	0	1	0	0
-0.0105543	-0.842796	0.175762	0	0	0	0	1	0
-0.0247718	-1.254395	0.333946	0	0	0	0	0	1
0.0189204	1.3051988	-0.17751	0	0	0	0	0	0
1.3051988	-30.65172	0.921531	0	0	0	0	0	0
-0.1775139	0.9215305	-2.33151	0	0	0	0	0	0

326.5384   -6.654496

-58.99457

-221.0272

$$\begin{pmatrix} 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 1 & 0 \\ 0 & 1 \end{pmatrix}$$

$$\begin{pmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \\ 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$$

Mějme bezrizikové aktivum s výnosností $r_f = 3{,}5\%$

a portfolia umístněná na efektivní množině. Sestrojte graf umístnění jednotlivých portfolií, j

Riziková portfolia	A	B	C	D
$\overline{r}_p$	0.0620	0.0400	0.0750	0.0840
σ_p	0.1450	0.0970	0.1700	0.2000

rf   0.035

sigmaf   0

U všech portfolií budeme volit podíly (váhy) takto:

	1.	2.	3.	4.	5.
r_f	0.2	0.4	0.5	0.6	0.8
Portfolio	0.8	0.6	0.5	0.4	0.2

výnosnosti
A	0.0566	0.0512	0.0485	0.0458	0.0404
B	0.039	0.038	0.0375	0.037	0.036
C	0.067	0.059	0.055	0.051	0.043
D	0.0742	0.0644	0.0595	0.0546	0.0448

rizika
A	0.116	0.087	0.0725	0.058	0.029
B	0.0776	0.0582	0.0485	0.0388	0.0194
C	0.136	0.102	0.085	0.068	0.034
D	0.16	0.12	0.1	0.08	0.04

estliže budeme měnit podíly investování do bezrizikového aktiva a rizikového portfolia.

0.2