Práctica 4: Neural networks

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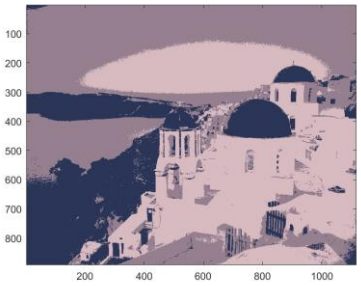
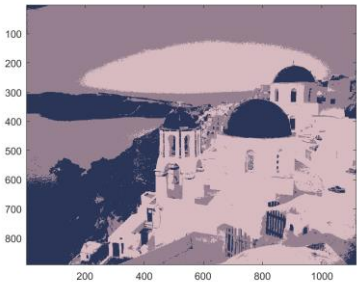
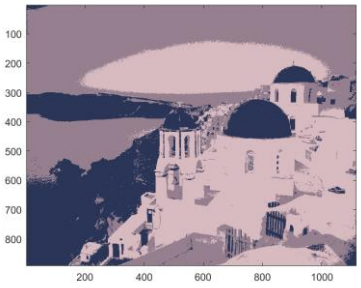
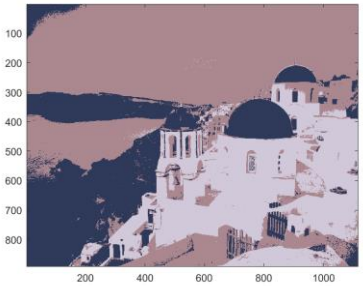
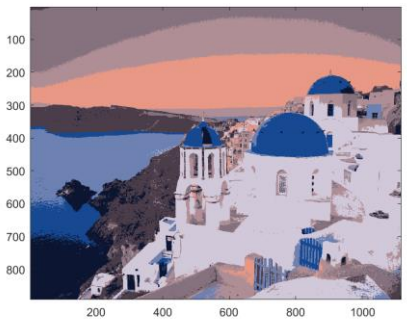
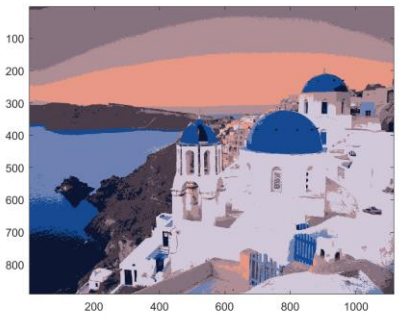
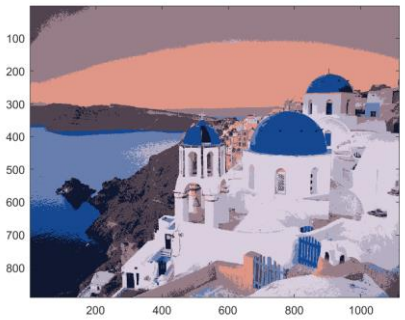
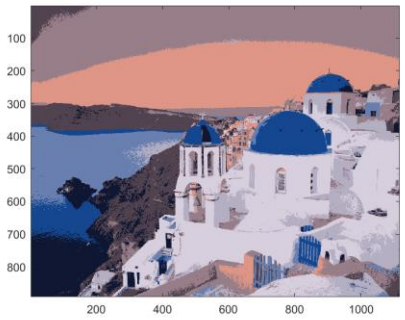
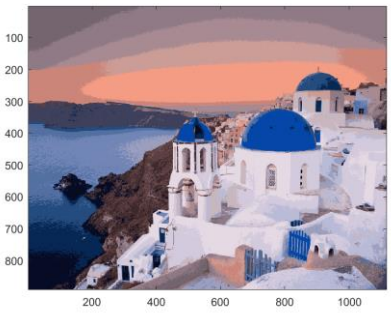
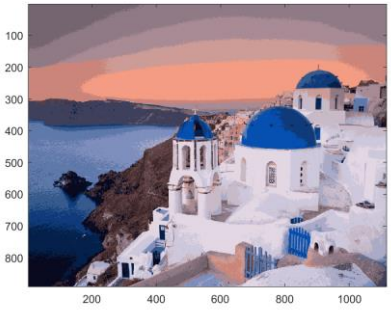
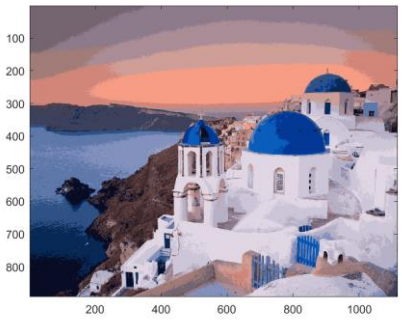
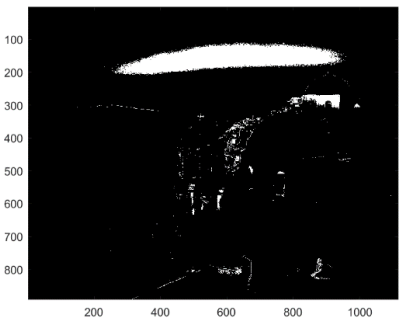
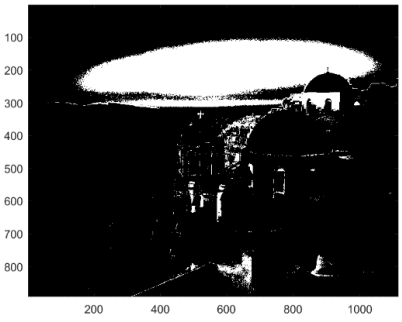
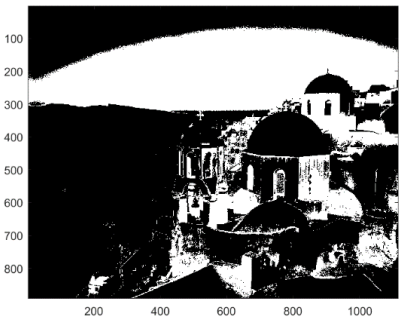
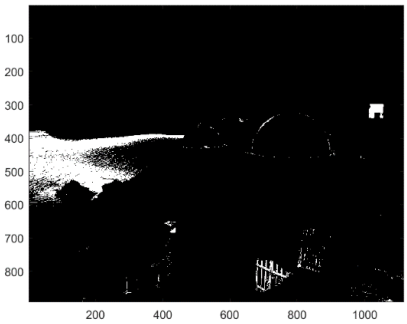
1.1. Segmentation of images by colour. K-means algorithm.

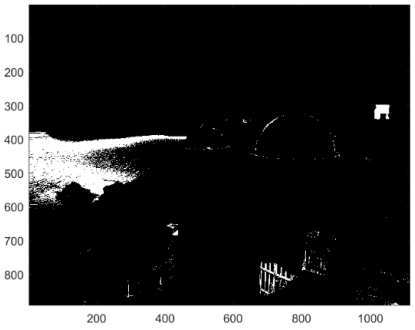
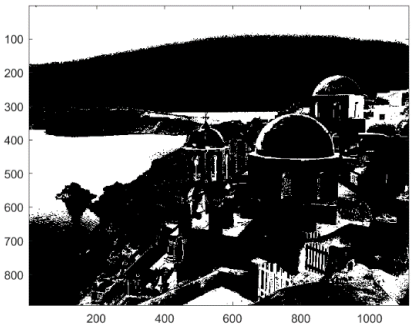
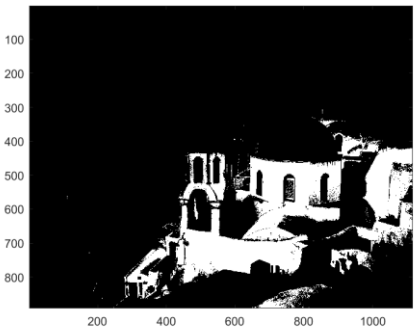
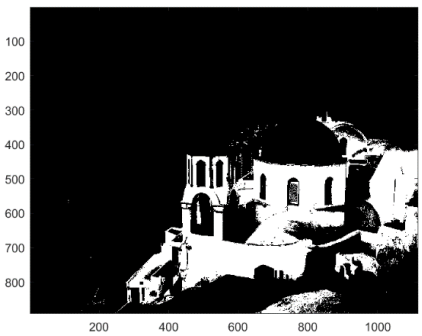
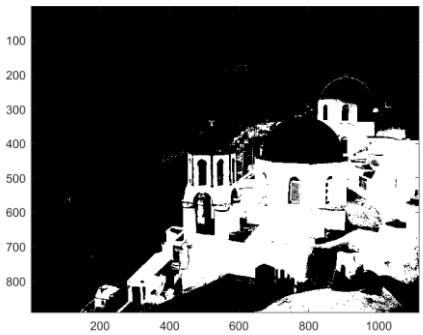
		Quantization time		Image
		k-means	**clustered image**	
3 colours	Sample: 100%	3.856169	2.140518	
	Sample: 50%	2.295598	17.650084	
	Sample: 20%	1.031012	20.59451	
	Sample: 5%	0.439968	22.574565	

8 colours	Sample: 100%	7.591781	2.063228	
	Sample: 50%	4.547850	58.645375	
	Sample: 20%	1.718256	58.175427	
	Sample: 5%	0.769762	59.339386	

20 colours	Sample: 100%	20.299833	5.252725	
	Sample: 50%	20.237967	84.275172	
	Sample: 20%	8.227148	169.315643	
	Sample: 5%	1.289883	170.274501	

64 colours	Sample: 100%	94.593572	4.329579	
	Sample: 50%	52.686457	309.788127	
	Sample: 20%	19.261886	518.145636	
	Sample: 5%	2.498916	260.829819	

		Segmentation time	Image
Point at the sky	nc = 500	3.699569	
	nc = 1500	4.088753	
	nc = 5000	5.667161	
Point at the sea	nc = 500	3.973287	
	nc = 1500	4.150364	

			
	nc = 5000	4.268857	
Point at the building	nc = 500	3.982355	
	nc = 1500	4.001334	
	nc = 5000	4.061879	

Conclusions:

The difference in behavior between these two programs is that for the first one k-means works longer, because we use all the data instead of sampling, but on the other hand, time consumed by the second one for creating an image is also greater than for the first, because it uses function most_similar to understand which class each point belongs to. You can see that total time used by the second program is usually greater. We expected that the quality of images obtained by using the second program will be significantly lower, but in reality it is almost the same even for small training samples (sometimes sky region is not so detailed, but it does not matter too much). For segmentation we used initial image. We noticed that the time of segmentation is almost equal for different values of nc, but results obtained with nc = 5000 were the most natural.