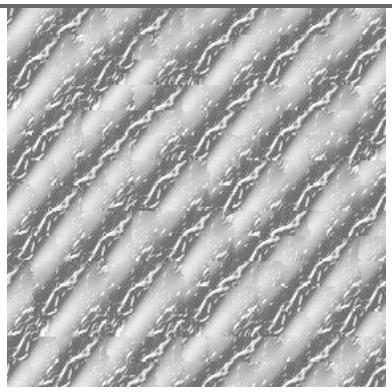
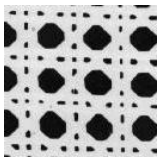
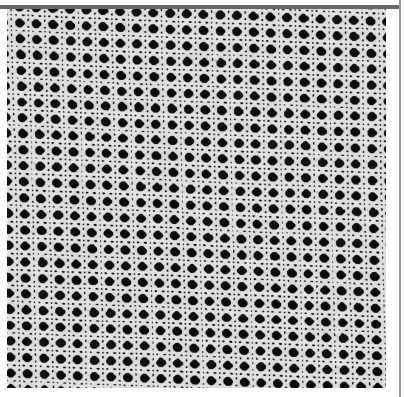
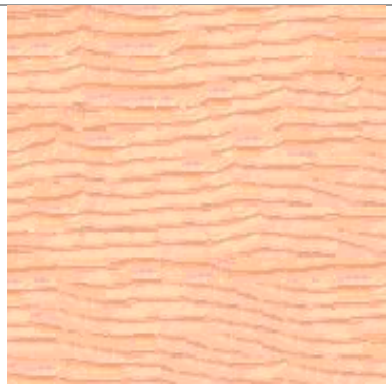
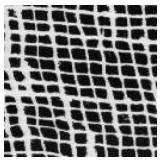
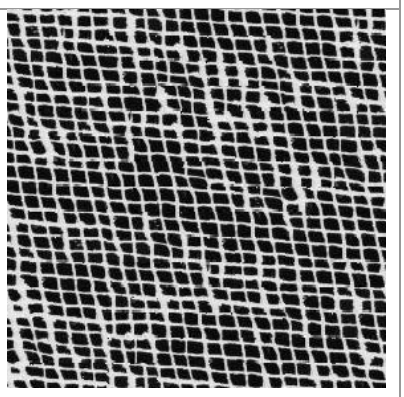
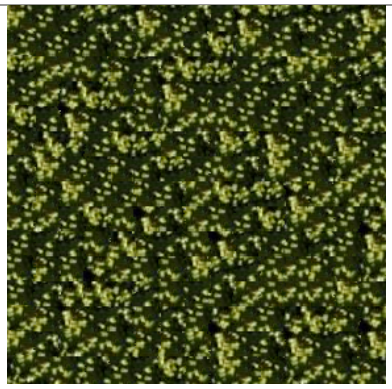
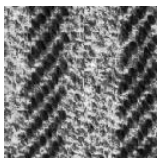
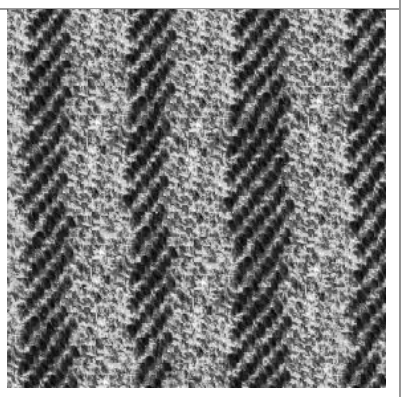
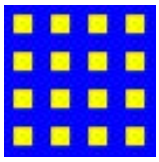
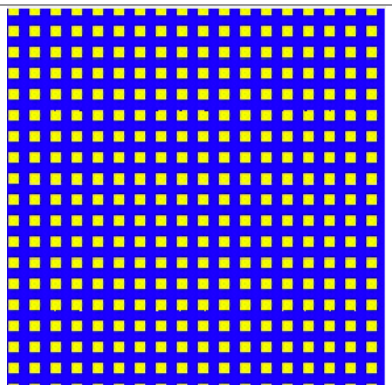
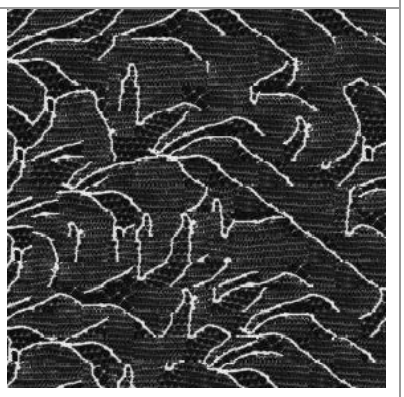
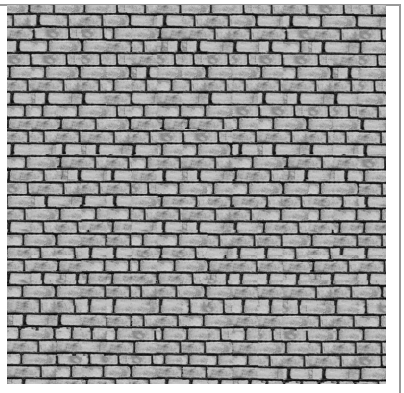
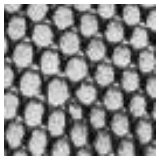
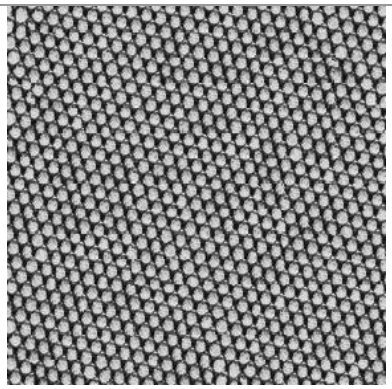
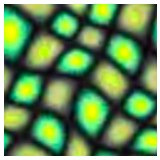
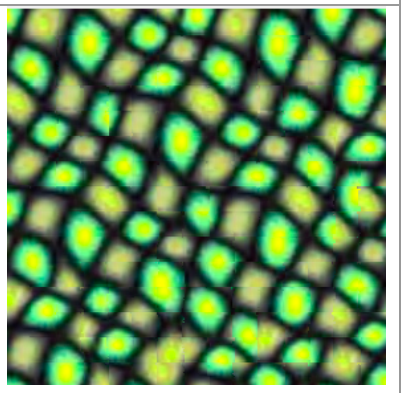
Name: Yu Shixin Matric. No.: A0195017E Date: 2019/3/30

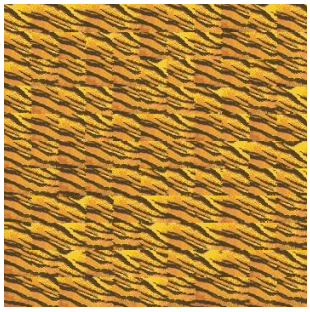
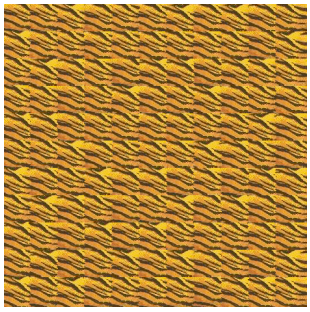
Part I. Basic synthesis algorithm:

The result of texture synthesis:

Texture	Synthesis	Texture	Synthesis
 1		 7	
 2		 8	
 3		 9	
 4		 10	

 5		 11	
 6		 12	

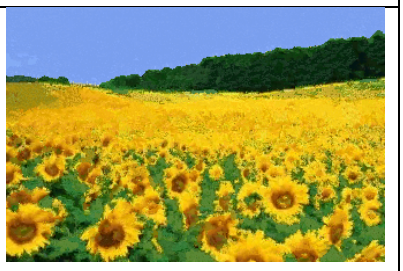
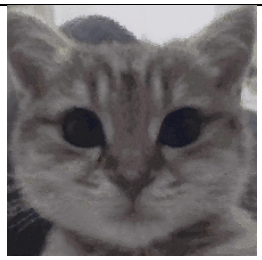
All the 12 textures above are in different size of pixels and structure. For small size textures, we need to choose a small scan window, because it is harder to find high correlation pixel block for the larger size one than the smaller size one in the situation of deficient texture material. According to the figure below, the size of original texture is 65, and we can find that with the larger size of scan window is, the more repetition block has.

Block size=15	Block size=23	Block size=39	Block size=51
			

For strong structure but less repetition texture (such as 5, 10, 12), they need more texture material. Thus, comparing with the other same size texture, we should choose smaller scan window. The more different type of material can be find from the original texture, the better performance the synthesis algorithm has. But the larger the scan window is, the slower speed of synthesis is. Speaking of the best size of the synthesis process, for 65 pixels picture, the size between 30 and 20 can get a good performance, normally. But it is also related to the location of first block in the original texture, if it is situated in the right bottom corner, it may not perform well, due to the lack of proper next pixel block. Thus, the size of scan window is between 1/3 and 1/2 of

the size of texture. In conclusion, in order to get better quality of result, we need choose a proper size of scan window.

Part II. PatchMatch:

No.	Structure Image	Color Image	Reconstructed Image
1			
2			
3			
4			

For reconstructed image in group 1, we can find that the color of sky comes from the color of sky in color image. For reconstructed image in group 2, the right building which is not in color image but similar to another building in color image, so the color of this comes from this building.

As for how to get better result, the object feature and color between 2 image can not differ too much. For example, I implement the algorithm by using one green can and one red can. Although the shape of those two cans are very similar, it does not get a good ideal result.