

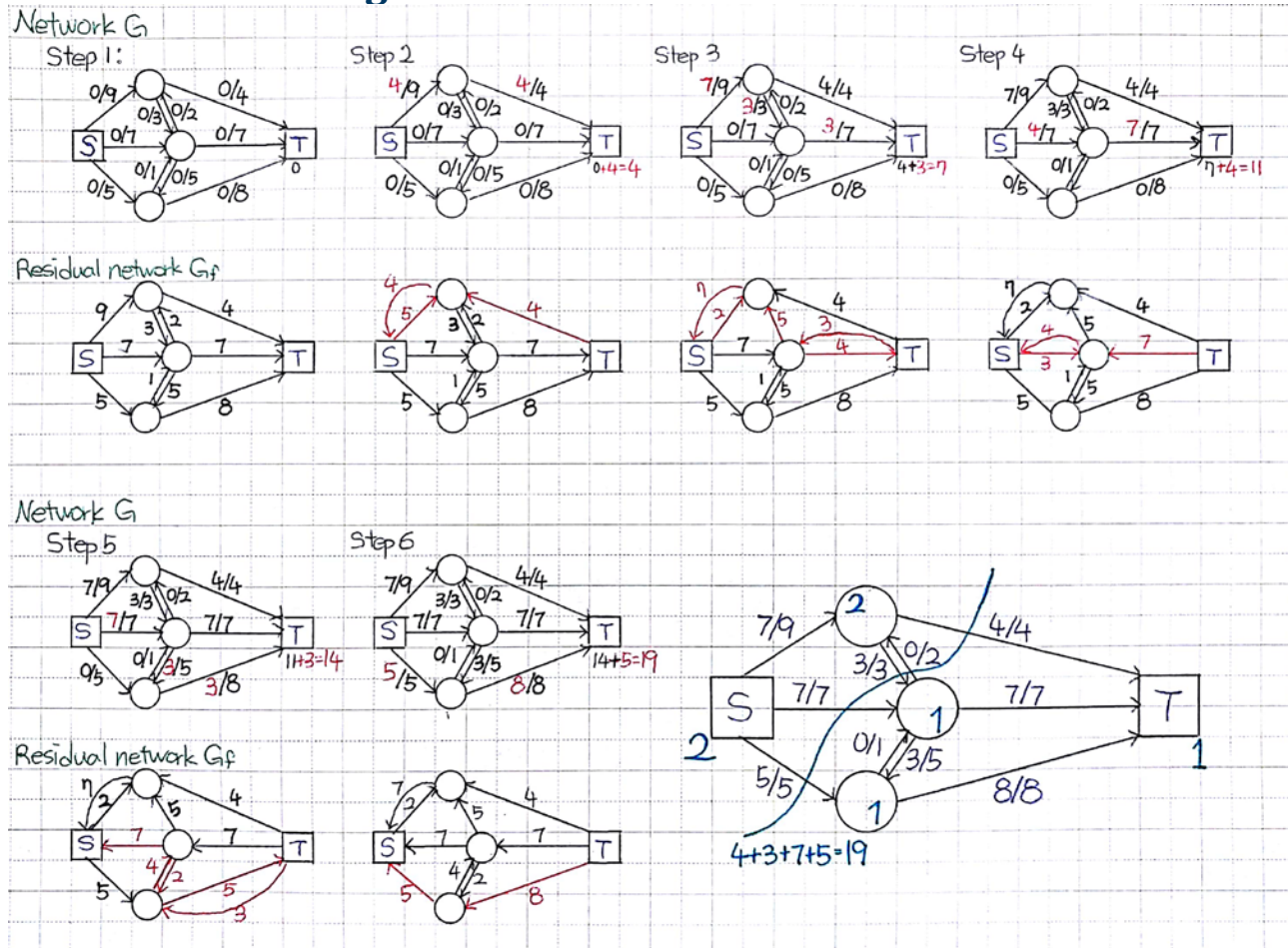
EXERCISE 4: GRAPH CUT

GCT722 MATHEMATICAL METHODS FOR VISUAL COMPUTING

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TASK 1: HANDLING MAX FLOW

Results of Labelling & Max Flow



TASK 2: INTERACTIVE SEGMENTATION

Optimal labeling for the graph of task 1

| 작업 공간 | |
|----------|---------|
| 이름 ▲ | 값 |
| cutCost | 19 |
| h | 10001 |
| labeling | [2;1;1] |

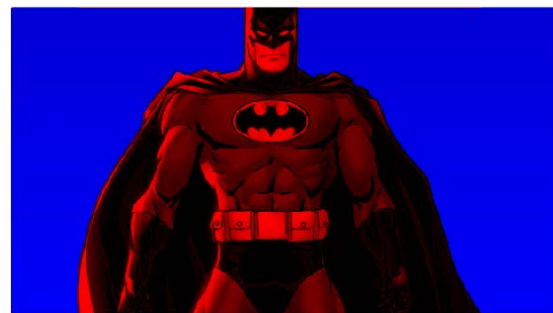
→ code/GraphCut/handleMaxFlow_t01.m

Segmentation of the provided images

- Batman



→ $\lambda = 1.0$



→ $\lambda = 0.002$

- Van Damme



→ $\lambda = 1.0$



→ $\lambda = 0.0001$

Pictures with a new background

- Batman



- Van Damme



Segmentation of my image

- Pooh



→ $\lambda = 1.0$



→ $\lambda = 0.002$



Instructions for running

- **Task1**

1. Open the file “BK_BuildLib.m” in code/GraphCut and run it.
2. If build process is clear, open the file “handleMaxFlow.m” and run it.
3. Check the result variables in workspace.

- **Task2**

1. Add the path of “GraphCut”, “GUI” and “hw” for running.
2. Open the file “BK_BuildLib.m” in code/GraphCut and run it.
3. If build process is clear, open the file “InteractiveGraphCut.m” and run it.
4. Click the “Open File” icon and load the image for segmentation
5. Click the red pen icon and indicate(draw) the foreground region.
Click the blue pen icon and indicate(draw) the background region.
6. Click the “segment” icon and check the result.
7. If you want to synthesize the result with a background, click the “Open Background” icon.
Click the “segment” icon and check the result figure.

Discuss the results

I have implemented graph cut using BK_Matlab library and do the image segmentation with it.

In Task1, I made the graph of example in matlab using BK_Matlab library. In the data term, unary, which is the cost of the source and goes into the sink, is used. In the smooth term, the pairwise cost, which is the cost between the nodes, is used. Then I drew the graph by hand and compare it with that of Matlab version. The result is same: label is 2 1 1 (2: foreground, 1: background) and cut cost is 19.

In Task2, I did the segmentation with several images and synthesized a segmented character with a specific background. The smaller the value of lambda, the smaller the effect of unary and the greater the effect of pairwise. If there is no pairwise, the same result is obtained if the value of lambda is 0 or more. In the Batman image, there is white areas on both the background and the Batman character. In this case, the better the segmentation result, the smaller the lambda value is (the line is drawn to that part).