# EXERCISE 4: Graph cut

GCT722 MATHEMATICAL METHODS FOR VISUAL COMPUTING  
20183151 Chaelin Kim

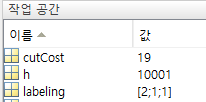
## task 1: Handling max flow

### **Results of Labelling & Max Flow**

* **Hand drawing**

## task 2: interactive segmentation

### **Optimal labeling for the graph of task 1**



* code/GraphCut/handleMaxFlow\_t01.m

### **Segmentation of the provided images**

* **Batman**
* **Van Damme**

### **Pictures with a new background**

* **Batman**
* **Van Damme**

### **Segmentation of my image**

* **Pooh**

### **Instructions for running**

* **Pooh**

1. Open the file “main.m” in Matlab.
2. Execute that file.
3. The window that shows the result images and graph is opened.
   1. The left part shows result images of applying BnB before and after.
   2. The right part shows the result plot of convergence of bounds

### **Discuss the results**

I have implemented coverage maximization by branch and bound where the model to find is the (x, y) 2D position of the antenna. The upper and lower bounds are converged at **iteration 140**. The result of the antenna location is **(623.5918, 322.0938)** and the number of inliers is **64** (the iterations stop when the lower and upper bound are nearer than 1). The execution time is about 2 secs, so it finds the optimal solution quite fast.

The branch and bound is methods for global optimization problems, so normally it is slower than methods for local optimization problems. In addition, if the points are comparatively scattered, it will search most spaces. So the execution time depends on the number of data points and how data points are scattered. But the branch and bound method is faster than exhaustive search, because in this method we cannot search the space estimated there is no optimal solution. Also, it guarantees the optimal solution because it considers global objective values.