Project 1

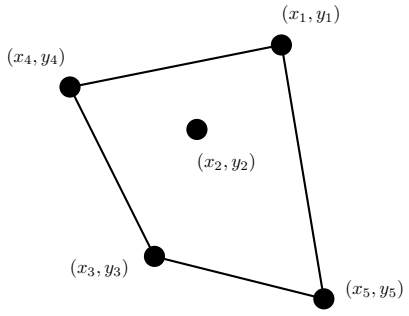
The first project is writing a Matlab function `convex.m` which works as follows.

- As an input, `convex.m` takes the two arguments `arg_x` and `arg_y`. These are the array of x and y coordinates of n points in $\mathbf{R}^2$.
- As an output, `convex.m` draws the *convex* domain containing all n points above, and prints the area of this convex domain.
- Suppose that x_i, y_i $i = 1, \cdots, 5$ are real numbers and we enter the following command at the folder containing the file `convex.m`.

```
> x = [ x1 x2 x3 x4 x5 ]
> y = [ y1 y2 y3 y4 y5 ]
> convex(x,y)
```

  Then the figure pops up as well as the value of the area prints on the command line.

```
Ans =
      (area_of_domain)
```

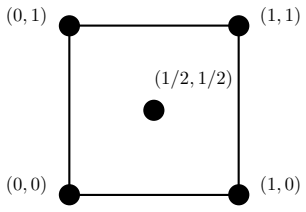


- For example, the following command draws the square and its area

```
> convex([ 0 1 1 0 1/2 ], [ 0 0 1 1 1/2 ])
```

  The result is

```
Ans =
      1
```



- See the next page for the instruction.

Important notes

- Each project group must submit an **m-file** (10 points) `convex.m` and an **1-page report** (10 points).
  - The m-file `convex.m` must executable in Matlab. -1 from the total score for each minor error (which can be easily fixed.) If there is no hope of editing the code to make it executable, there will be no point.
  - The row of input matrix A which represent the points determining the convex domain can be random. This means that the function output the same answer even if the rows of A are shuffled.
  - In the figure window, the **text** of coordinates of the points and **dot marks** for all points should appear.
  - In the 1-page report, you must explain how does your code works in m-file. -1 point for exceeding 1-page. The font size must be **bigger than** 10 **pts**.
  - The report must explain the algorithm of your code in detail. Each ambiguous expression or lack of explanation will deduce the total score by -1. If the contents of the reports does not match to the functionality of the m-file, the score will be 0.
- Due date is **Oct. 19th, 11:59pm**. You must submit through LMS by one of group members.
- In the presence of similarities between codes or report from different groups, the work of both groups will be counted as plagiarism, and all members will fail the course.

How to obtaining bonus points

- Your code should be neat and concise. I will pick top two codes satisfying the each criteria and give 2 points to each group.
  - The code has fewest command lines.
  - The function has extra features other than required ones, such as colorings, error correcting options, etc. If your features not visible, you must explain them in your report.
- The report also needs to be well-written. I will pick one best report and give 2 points to the group.
- Each bonus points adds to the maximum 10 points for each section. That means, you can not earn more than 10 points for writing code or report. Total 20 points.