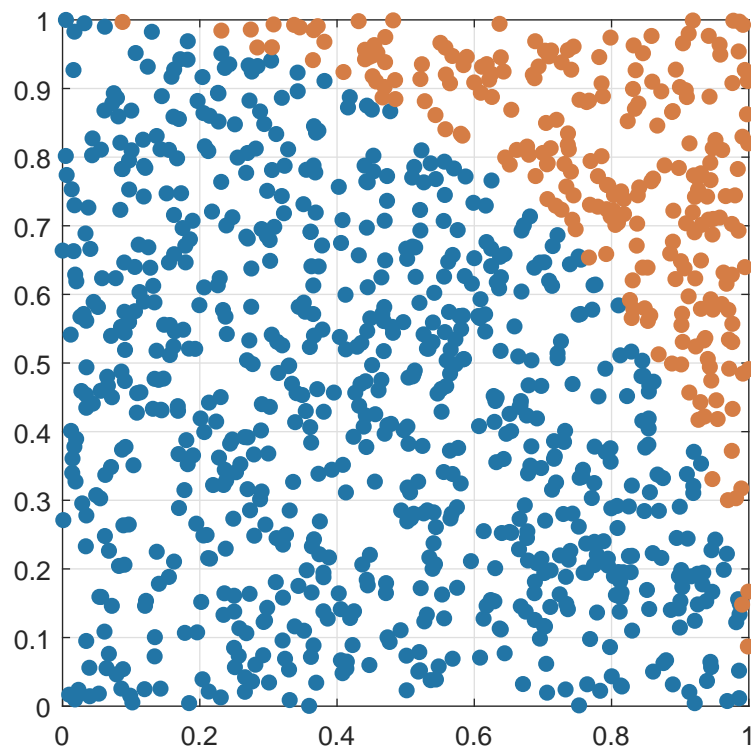


Introduction to Matlab Programming with Applications

Midterm Examination on January 17, 2020
Spring 2020

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Problem 1 Recall that we have conducted a Monte Carlo simulation to estimate π in pp. 78–79 of the slides. Now modify your script to (1) draw a figure like below and (2) save it as a jpeg file.



Problem 2 The number e is a mathematical constant, approximately equal to 2.71828. Write a program to estimate e by using Monte Carlo simulation. It can be done as follows. Let M be the number of iterations. For iteration i , find the minimal number n_i so that $\sum_{j=1}^{n_i} r_j > 1$ where r_j is the random variable following the standard uniform distribution (simply use **rand**). Then we have

$$e \sim \frac{1}{M} \sum_{i=1}^M n_i.$$

Problem 3 Write a function which counts elements in an array. You may use `sort` and `diff`. Do not use `unique` in your solution. For example,

```
1 >> A = randi(3, 1, 10) % As a testing data.
2
3 A =
4
5     1     1     1     1     3     3     1     3     1     2
6
7 >> freq(A)
8
9 elements =
10
11     1     2     3
12
13
14 counts =
15
16     6     1     3
```

SUBMISSION

1. Pack your source codes into a zip or rar file with your full name.
2. Send the zip/rar file to d00922011@ntu.edu.tw.

Congratulations!!!

*“To start, you don’t have to be good;
to be good, you have to start.”*
– Slogan of [NTU Toastmasters](#)