



# Polytechnic Tutoring Center

## Final Exam REVIEW – CS1133, Spring 2021

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*Disclaimer: This mock exam is only for practice. It was made by tutors in the Polytechnic Tutoring Center and is not representative of the actual exam given by the Academic Department.*

### *Question 1*

Germaine wants to email her friends at NYU a meme which she feels captures the full NYU experience. He does not want to email the meme to anyone else because he believes they simply will not get it. Germaine also found a meme which references the company where he is doing an internship, and would like to send it to his fellow interns. Germaine does not want anyone else on his email list to feel left out, so he will email everyone who is not receiving the meme, excluding individuals from the company where he does his internship, a picture of an adorable puppy.

The format of each email address can be used to distinguish different groups of people on Germaine's contact list. Anyone affiliated with NYU will have an email address ending in "@nyu.edu". Everyone working at the company where Germaine interns has an email address ending in "@company.com". All interns working at the company have the character "#" somewhere in their email address (the specific location is not significant). This is a feature specific to interns, and no one else working at the company has this feature in their email address.

Write a program which can provide three separate lists of emails. The first list should contain the email addresses of anyone affiliated with NYU. The second list should contain email addresses of interns at Germaine's company. The third list should contain the email address of anyone who is not affiliated with NYU and does not work at Germaine's company. You should create a user-defined function to determine if a given email address ends in a given domain name (ex: @nyu.edu, @company.com, @aol.com, etc.). Germaine's contacts are given in the following character vector. Copy and paste this into your code to use with the problem.

```
EMAILS = char('#ks641@company.com', 'dn266@aol.com', 'u#m895@company.com', ...  
             'qu946@nyu.edu', 'ko737@company.com', 'of749@nyu.edu', ...  
             'ek594@hotmail.com', 'on466@nyu.edu', '#ze384@company.com', ...  
             'db038@nyu.edu', 'sp188@nyu.edu', '#zc497@company.com', ...  
             'iu690@company.com', 'ds834@gmail.com', 'io448@nyu.edu');
```

Your code should produce the following output display.

```
The following email addresses correspond to individuals from NYU:  
qu946@nyu.edu
```

of749@nyu.edu

on466@nyu.edu

db038@nyu.edu

sp188@nyu.edu

io448@nyu.edu

The following email addresses correspond to interns from Company:

#ks641@company.com

u#m895@company.com

#ze384@company.com

#zc497@company.com

The following email addresses correspond to other people on the list:

dn266@aol.com

ek594@hotmail.com

ds834@gmail.com

## ***Question 2***

Write a function which can determine how many characters within a given string are numbers, how many are letters, and how many are neither of these two types of characters. Your function should also determine the locations of the numbers and letters in the string.

In order to complete the task, your function should call on another user defined function which can be used to determine which characters within a string belong to a certain group of characters (letters in the range from 'A' to 'Z', digits in '0' to '9', etc.). This function should output the location of characters falling within the specified range and the number of characters that fall in the specified range.

You should write a script file to be used with your functions. You may use vectorized operations.

The output display produced by your script should resemble the following:

```
Please input a string to check: j0!B-5g?N"e3
This string contains 5 letters, 3 numbers, and 4 other characters.
The letters are in the following positions: 1   4   7   9  11
The numbers are in the following positions: 2   6  12
```

### *Question 3*

Write a function that determines if a given password has at least  $k$  consecutive letters or digits in ascending order. The function should also identify the locations of the problematic segment. If the password has less than the maximum number of consecutive uppercase letters or digits, the returned logical value should be false, and the location is meaningless.

For the above password, and if the maximum allowed consecutive letters or digits in ascending ordered is three, then the function should set and return a logical variable having the value of true, and a variable for the location of the problematic segment having the value of 6.

Write a script program to input a string consisting only of uppercase or digits from the user. Data validation is not needed. Then with the use the above function, determine whether the password is acceptable in the sense described here.

Here are three examples of the displayed results:

```
Enter a string of uppercase letters and digits: XKLM8MWQ45678ADV
Has at least 4 consecutive letters or digits.
Starting at location: 9
```

```
Enter a string of uppercase letters and digits: X012TKLMWQ94ADV
Less than 4 consecutive letters or digits!
The value of the second output has no meaning.
```

```
Enter a string of uppercase letters and digits: X012TKLMWQ94ADV
Has at least 3 consecutive letters or digits.
Starting at location: 2
```

### *Extra Practice*

Write a function which will be given two vectors, Needles and Haystack. Needles is a vector of numbers which may or may not be present in Haystack. Your function will return a vector in which each value represents the number of times each of the numbers in Needles appears in Haystack. Your resultant vector will be the same size as Needles. Do not use any vectorized operations or use functions that have parameters that are arrays. The only exception is the use of the function length.

Also write a script program to run and test the above function that you created. As an example, if Needles is [ 0 4 6 ] and Haystack is [ 0 4 8 7 4 9 4 3 0 ] then your result would be [ 2 3 0 ].