# Course Description

**Weekly Overview**

This week has the first major programming lab for students. It is a “word search” type lab that requires knowledge of regular expressions as well as iteration. Students will also see basic file I/O for the first time.

# Institutional Learning Outcomes

**Main Objectives**

* Apply the knowledge of regular expressions, iteration, and conditional programming to solve problems

# Discipline Specific Outcomes

# Student Readings

None

**Daily Outline**

Day 1: Regular Expressions Lab

Day 2: Regular Expressions Lab (continued)

Day 3: Regular Expressions Lab (continued)

Day 4: Regular Expressions Lab (continued)

Day 5: Flexible

**Included Resources**

Lab Assignment: Regular Expressions and English Words

WORD.txt (See teacher resource folder – the file is too big to include here)

words.java

**Lab Assignment: Regular Expressions and English Words**

There are several objectives to this lab:

1. Increase your knowledge of the String class in Java
2. Practice iteration
3. Practice using regular expressions to find words
4. Explore file input
5. Practice using a Java API

You will be given the file WORD.txt file that contains all of the words in the English language. You will also be given the base file words.java file that demonstrates how to gets input from a file. Your task is to answer as many of the following questions as possible in the four allotted days. Many can be solved using a regular expression, but some cannot. I am not telling you which ones. You will get a bonus point for using a regular expression to solve the problem.

The required files can be pulled down from GitHub.

The last goal is using an “API.” An API (Application Program Interface) is a list of methods that can be called on certain objects. (This is oversimplified, but for now is okay.) The API for the String class is located here: <https://docs.oracle.com/javase/7/docs/api/java/lang/String.html>

You may use any method from the String class that you can figure out how to use. Some are very powerful.

***The Questions***

1. Find all words that begin and end with an a.
2. Find all words that are 12 letter long.
3. Find all words that are 10 letters long and do not have any repeating letters.
4. Find all of the words that contain more than one z.
5. Find all words that end with “nym”.
6. Find all of the words that contain exactly five occurrences of c.
7. How many words are there in the English language?
8. How many words do not contain the substring “ing”?
9. Find the longest English word that can be written with the top row of a standard keyboard.
10. Find all English words that contain the trigraph spb and have at least two r's.
11. How many words start with q and have an odd length?
12. How many words start and end with a vowel?
13. What is the longest word in the English language? (If there is a tie, please list all words of that length.)
14. How many two-letter words are there in the English language? List them.
15. What is the average word length?
16. How many words contain no vowels (a, e, i, o, u)? Are there any that are also missing a y?
17. How many four-letter words are formed using 2 or less different letters, e.g. peep. Are there any words longer than 4 letters that have the same property?
18. List all palindromes in the English language. A palindrome is a word that reads the same when it is written backwards, e.g. radar.
19. Find all the words (if any) that have the letters ‘a’, ‘e’, ‘i’, ‘o’, ‘u’ exactly once in that order (though not necessarily consecutive)? Are there any words with the same property for ‘a’, ‘e’, ‘i’, ‘o’, ‘u’, ‘y’? What about ‘u’, ‘o’, ‘i’, ‘e’, ‘a’?
20. Find all the words whose letters are in alphabetical order. (“annoy” counts despite the double ‘n’.)
21. Find all the words whose letters are in “pure” alphabetical order. (“annoy” does not count due to the double ‘n’.)
22. What words contain only vowels (including ‘y’)? What words contain only vowels (not including ‘y’)?

//words.java

import java.util.\*;

import java.io.\*;

import java.util.regex.Pattern;

import java.util.regex.Matcher;

public class words{

public static void main(String[] args) throws IOException{

Scanner input = new Scanner(new File("WORD.txt"));

//This example find all words that have at least two a's in a row

//It also demonstrates file processing

while(input.hasNextLine()){

String word = input.nextLine();

Pattern p = Pattern.compile(".\*aa.\*");

Matcher m = p.matcher(word);

if(m.matches()){

System.out.println(word);

}

}

}

}