CS350 – Lab 6
Due Date: March 14

Purpose: Nondeterminism is a powerful tool that captures the notion of multitasking or performing multiple computations in parallel. One use of this tool is to try multiple possible actions at the same time and see which, if any, lead to fruitful results. The purpose of this lab is for you to use nondeterminism to achieve tangible results.

Knowledge: This lab will help you become familiar with the following content knowledge:

- How to use multiple threads to achieve nondeterminism in python.

- How to view nondeterminism as a computation tree.

- How to use nondeterminism with a Turing machine.

Task: Follow the steps in this lab carefully to complete the assignments.

Assignment 1:
Complete exercise 8.1 on p160 in the text. You can parse the input string by using index and substring operations. For example, the following code will extract the value of k:

```
i = inString.index(';')
k = int(inString[:i].strip())
inString = inString[i+1:]
```

Criteria for Success: The input "823;18910 5235 3422" produces no since none of the values are multiples of 823 and the input "823;18910 5235 3422 1646" produces yes.

Assignment 2:
Complete exercise 8.2 on p160 in the text.

Criteria for Success: The input "823;18910 5235 3422" produces no since none of the values are multiples of 823 and the input "823;18910 5235 3422 1646" produces 1646.

Assignment 3:
Complete exercise 8.4 on p161 in the text.

Criteria for Success: For each of the computation trees you have either given the output or stated that the result is undefined.

Assignment 4:
Complete exercise 8.9 on p162 in the text.

Criteria for Success: You have a completed a) through d). For d) you have a clear explanation of why you will hit the nondeterministic points a finite number of times for any input.

Assignment 5:
In JFLAP create a nondeterministic Turing Machine which accepts only strings of A's surrounding by x's on each side if the number of A's is either a multiple of 2 or a multiple of 3.

Criteria for Success: The strings xAAAAx and xAAAAAAAAAx would both be accepted since the first is a multiple of 2 and the second is a multiple of 3. But the string xAAAAAx would not be accepted.

Submit your python and jflap files in Canvas. Written answers and diagrams may be submitted in Canvas or on paper for grading.