Homework 1

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1. Regular Expressions (50 points)

Note: Used python re library for executing the regular expression for question 1.1 to 1.6

1.1. the set of all alphabetic strings:

```
line = ["why that is gr8!", "No, it is not gr8 at all!"]
for str in line:
  print(re.findall("[a-zA-Z\s]+", str))
#['why that is gr']
#['No', ' it is not gr', ' at all']
```

1.2. the set of all alphabetic words:

```
line = ["why that is gr8!", "No, it is not gr8 at all!"]
for str in line:
  print(re.findall(r"\b[a-zA-Z]+\b", str))
#['why', 'that', 'is']
#['No', 'it', 'is', 'not', 'at', 'all']
```

1.3. the set of all lower case alphabetic strings ending in a b:

```
line = ["Many programming languages provide regex capabilities, built-in, or via libraries.","Please use tab."]
for str in line:
  print(re.findall(r"[a-z]*b", str))
#['capab', 'b', 'lib']
#['tab']
```

1.4. the set of all lower case alphabetic words ending in a b:

```
line = ["Many programming languages provide regex capabilities, built-in, or via libraries.","Please use tab."]
for str in line:
  print(re.findall(r"\b[a-z]*b\b", str))
#[]
#['tab']
```

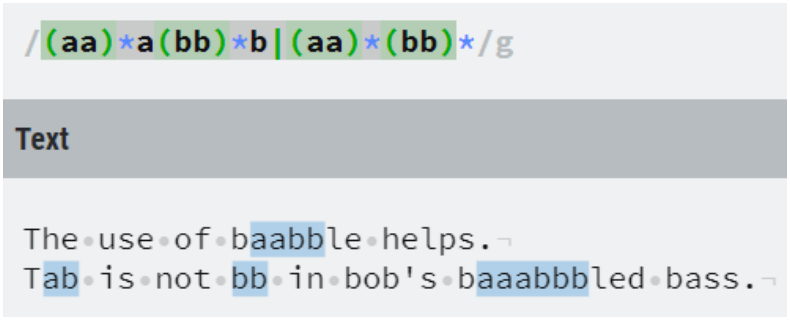
1.5. the set of all strings from the alphabet {“a”, “b”} such that each “a” is immediately preceded by and immediately followed by at least one “b”:

```
line = ["The use of babble helps.","Tab is not bob's bbabled bass."]
for str in line:
  print(re.findall(r"b+ab+", str))
#['babb']
#['bbab']
```

1.6. the set of all words from the alphabet {“a”, “b”} such that each “a” is immediately preceded by and immediately followed by at least one “b”

```
line = ["The use of babb helps.","Tab is not bob's bbabled bab."]
for str in line:
  print(re.findall(r"\bb+ab+\b", str))
#['babb']
#['bab']
```

1.7. the set of all strings from the alphabet {“a”, “b”} that form the pattern an b m where (n+m) is even; n>=0 and m>=0

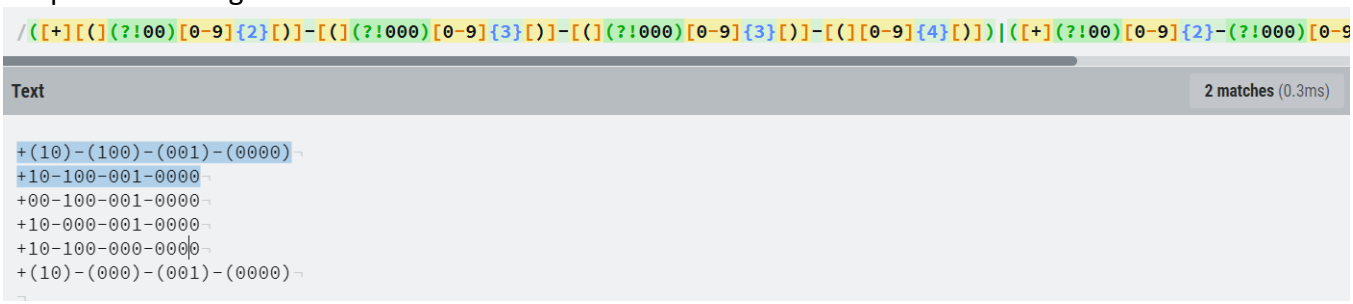


Check for even numbers of a followed by even numbers of b OR check for odd numbers of a followed by odd numbers of b. (Executed on regexr.com)

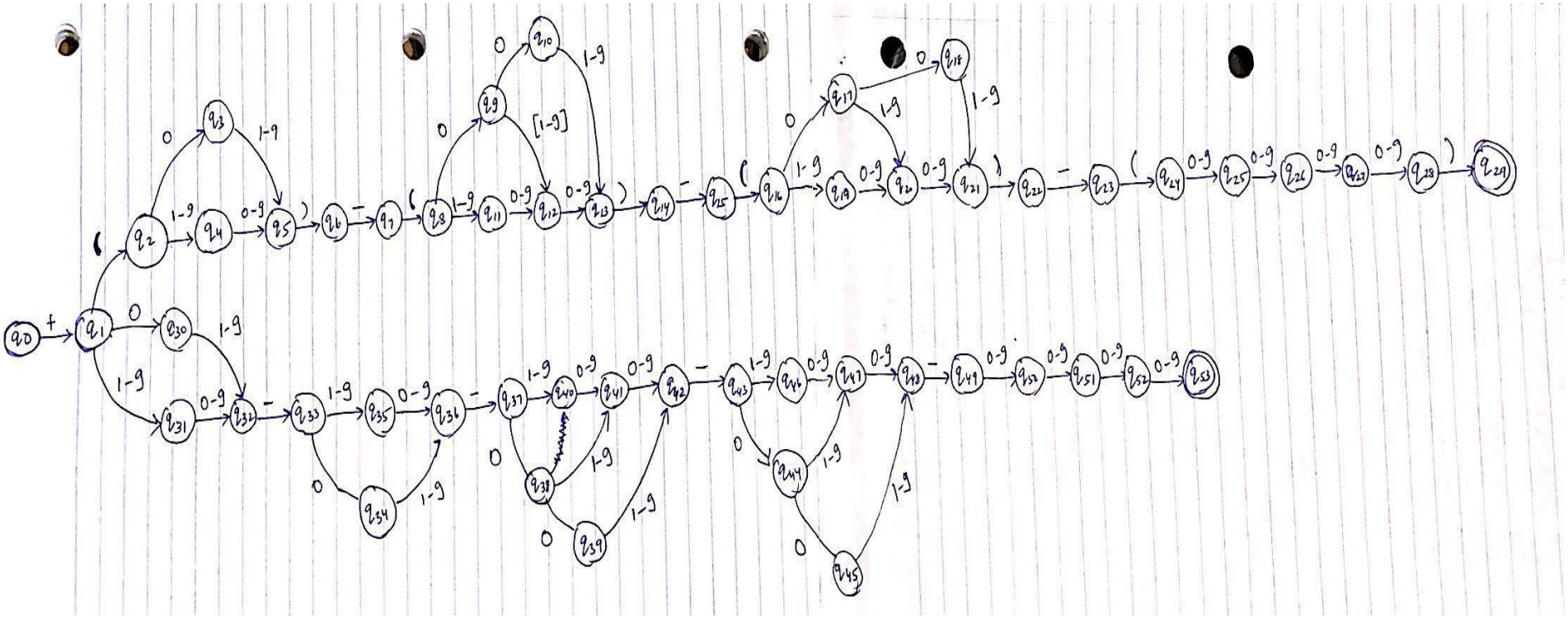
2. Telephone Number (50 points)

([+][(](?!00)[0-9]{2}[)]-[(](?!000)[0-9]{3}[)]-[(](?!000)[0-9]{3}[)]-[(][0-9]{4}[)])|([+](?!00)[0-9]{2}-(?!000)[0-9]{3}-(?!000)[0-9]{3}-[0-9]{4})

Snapshot from regexr.com:



Deterministic FSA attached below.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