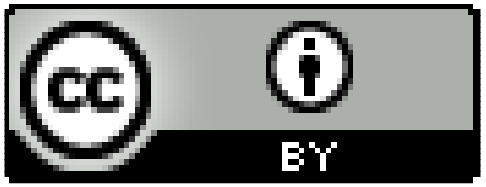
Regular Expressions

More Patterns



Notebook #1

Site	Date	Evil (millivaders)
Baker 1	2009-11-17	1223.0
Baker 1	2010-06-24	1122.7
Baker 2	2009-07-24	2819.0
Baker 2	2010-08-25	2971.6
Baker 1	2011-01-05	1410.0
Baker 2	2010-09-04	4671.6
⋮	⋮	⋮

Notebook #2

```
Site/Date/Evil
Davison/May 22, 2010/1721.3
Davison/May 23, 2010/1724.7
Pertwee/May 24, 2010/2103.8
Davison/June 19, 2010/1731.9
Davison/July 6, 2010/2010.7
Pertwee/Aug 4, 2010/1731.3
Pertwee/Sept 3, 2010/4981.0
  ⋮          ⋮          ⋮
```

```
# Get date from record.
def get_date(record):
  '''Return (Y, M, D) as strings, or None.'''

  # 2010-01-01
  m = re.search('([0-9]{4})-([0-9]{2})-([0-9]{2})',
                record)
  if m:
    return m.group(1), m.group(2), m.group(3)

  # Jan 1, 2010 (comma optional, day may be 1 or 2 digits)
  m = re.search('/([A-Z][a-z]+) ([0-9]{1,2}),? ([0-9]{4})/',
                record)
  if m:
    return m.group(3), m.group(1), m.group(2)

  return None
```

```
# Get all fields from record.
def get_fields(record):
  '''Return (Y, M, D, site, reading) or None.'''

  patterns = (
    ('(.+)\t([0-9]{4})-([0-9]{2})-([0-9]{2})\t(.+)',
     2, 3, 4, 1, 5),
    ('(.+)/([A-Z][a-z]+) ([0-9]{1,2}),? ([0-9]{4})/(.+)',
     4, 2, 3, 1, 5)
  )
  for p, y, m, d, s, r in patterns:
    m = re.search(p, record)
    if m:
      return m.group(y), m.group(m), m.group(d),
             m.group(s), m.group(r)

  return None
```

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    if m:
      return m.group(y), m.group(m), m.group(d),
             m.group(s), m.group(r)

  return None
```

Notebook #3

```
Date Site Evil(mvad)
May 29 2010 (Hartnell) 1029.3
May 30 2010 (Hartnell) 1119.2
June 1 2010 (Hartnell) 1319.4
May 29 2010 (Troughton) 1419.3
May 30 2010 (Troughton) 1420.0
June 1 2010 (Troughton) 1419.8
 ⋮          ⋮          ⋮
```

Notebook #3

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Date Site Evil(mvad)
May 29 2010 (Hartnell) 1029.3
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 ⋮          ⋮          ⋮
```

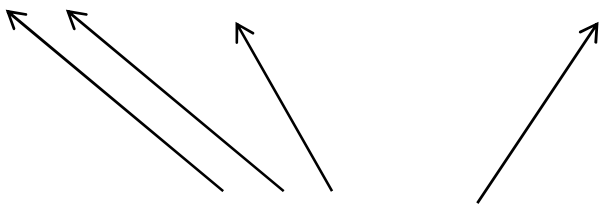

spaces

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May 29 2010 (Troughton) 1419.3
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 ⋮          ⋮          ⋮
```

But how to match parentheses?

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May 29 2010 (Hartnell) 1029.3
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 ⋮          ⋮          ⋮
```

But how to match parentheses?

The '()' in '(.+)' don't actually match characters

Put '\(' and '\)' in regular expression to match parenthesis characters '(' and ')'

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Another *escape sequence*, like '\t' in a string for tab

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In order to get the '\' in the string, must write '\\'

Put '\(' and '\)' in regular expression to match parenthesis characters '(' and ')'

Another *escape sequence*, like '\t' in a string for tab

In order to get the '\' in the string, must write '\\'

So the strings representing the regular expressions that match parentheses are '\\(' and '\\)'

```
# find '()' in text
m = re.search('\\(\\)', text)
⋮      ⋮         ⋮      ⋮
```

program text

```
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m = re.search('\\(\\)', text)
```
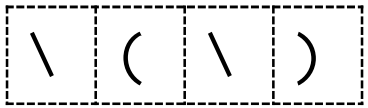
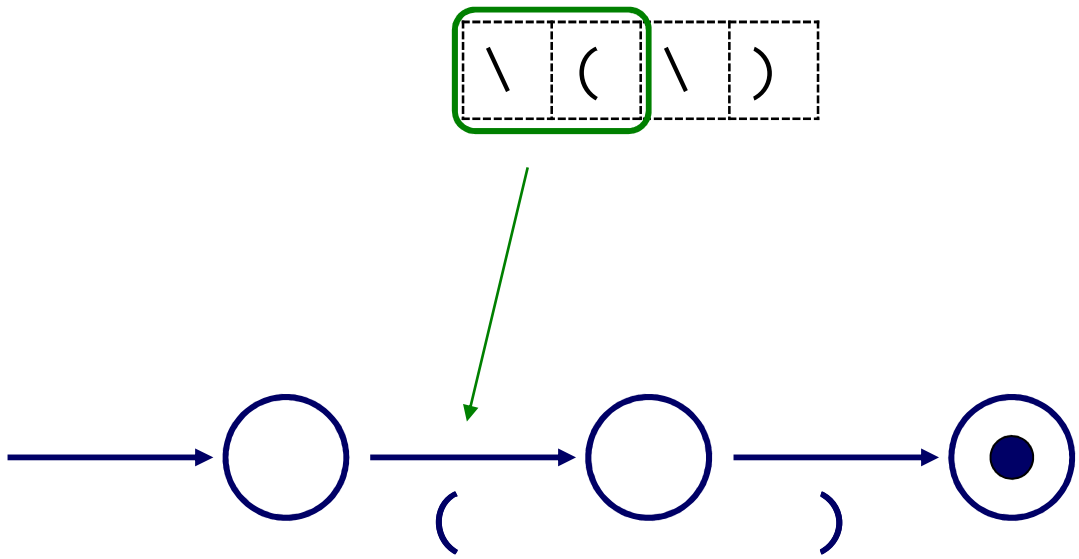



program text

Python string

```
# find '()' in text
m = re.search('\\(\\)', text)
```



program text

Python string

finite state machine

Notebook #3

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May 29 2010 (Hartnell) 1029.3
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 ⋮          ⋮          ⋮
```

```
'([A-Z][a-z]+) ([0-9]{1,2}) ([0-9]{4}) \\((.+)\\) (.+)'
```

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 ⋮          ⋮          ⋮
```

match actual '(' and ')'

'([A-Z][a-z]+ [0-9]{1,2} [0-9]{4} \\(.+\\) (.+)'

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 ⋮          ⋮          ⋮
```

match actual '(' and ')'

```
'([A-Z][a-z]+ [0-9]{1,2} [0-9]{4} \\((.+)\\) (.+)'
```

create a group

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 ⋮          ⋮          ⋮
```

match actual '(' and ')'

```
'([A-Z][a-z]+ [0-9]{1,2} [0-9]{4} \\((.+)\\) (.+)'
```

create a group

save the match

Some character sets come up frequently enough to be given abbreviations

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\d	digits	'0', '4', '9'

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actually the set of characters that can appear in a variable name in C (or Python)

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\d	digits	'0', '4', '9'
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actually the set of characters that can appear in a variable name in C (or Python)

Need to double up the '\' when writing as string

And now for an example of really bad design

And now for an example of really bad design

\S non-space characters

And now for an example of really bad design

\S non-space characters

that's an upper-case 'S'

And now for an example of really bad design

\S non-space characters

that's an upper-case 'S'

\W non-word characters

And now for an example of really bad design

\S non-space characters

that's an upper-case 'S'

\W non-word characters

that's an upper-case 'W'

And now for an example of really bad design

\S non-space characters

that's an upper-case 'S'

\W non-word characters

that's an upper-case 'W'

Very easy to mis-type

And now for an example of really bad design

\S non-space characters

that's an upper-case 'S'

\W non-word characters

that's an upper-case 'W'

Very easy to mis-type

Even easier to mis-read

Can also match things that aren't actual characters

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^ At the start of a pattern, matches the beginning of the input text

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re.search('^mask', 'mask size') => match

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$ At the end of a pattern, matches the end of the input text

re.search('temp$', 'high-temp') => match

Can also match things that aren't actual characters

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re.search('^mask', 'mask size') => match

re.search('^mask', 'unmask') => None

$ At the end of a pattern, matches the end of the input text

re.search('temp$', 'high-temp') => match

re.search('temp$', 'temperature') => None

\b Boundary between word and non-word characters

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re.search('\\bage\\b', 'the age of') => match

\b Boundary between word and non-word characters

re.search('\\bage\\b', 'the age of') => match

re.search('\\bage\\b', 'phage') => None

created by

Greg Wilson

June 2010