Moduler, rekursion och generatorer

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KTH EECS

18th September 2020

import module

Example (bad-module.py)

```
1 """This is a bad module"""
2
3 def hello_world():
4     """Prints 'Hello, world!'"""
5     print("Hello, world!")
6
7 hello_world()
```

Example (test-good-bad.py)

```
1 """Tests good and bad modules"""
2
3 import bad_module
4
5 bad_module.hello_world()
```

Example (good-module.py)

```
1  """This is a good module"""
2
3  def hello_world():
4      """Prints 'Hello, world!!!!!!'"""
5      print("Hello, world!!!!!!!!!!")
6
7  def main():
8      hello_world()
9
10 if __name__ == "__main__":
11     main()
```

Example (input-type.py, del 1)

```
1  """Take input more easily."""
2
3  def input_type(t, prompt=""):
4      """Take input, convert to type t; repeat if error."""
5      while True:
6          try:
7              return t(input(prompt))
8          except ValueError:
9              if t == int:
10                 print(f"Sorry, can't convert to integer.")
11             else:
12                 print(f"Sorry, can't convert to {t}.")
```

Example (input-type.py, del 2)

```
14  def main():
15      """Test functionality of this module"""
16      x = input_type(int, "x = ")
17      y = input_type(int, "y = ")
18      z = input_type(float, "z = ")
19      name = input_type(str, "Your name: ")
20
21      print(f"{x} + {y} = {x+y}")
22      print(f"z = {z}")
23      print(f"Your name is {name}")
24
25  if __name__ == "__main__":
26      main()
```

Example (Använda modulen)

```
1 import input_type
2
3 x = input_type(int, "x = ")
4 print(f"x = {x}")
```

```
$ pylint prog.py
```

```
def f(x):
    if p(x):
        return c
    else:
        return f(g(x))
```

Example (factorial.py, del 1)

```
1  """Calculate factorial"""
2
3  import input_type
4
5  def factorial(num):
6      """returns the factorial of num"""
7      if num == 1:
8          return 1
9      elif num < 1:
10         raise ArithmeticError("Must be positive numbers")
11     return num*factorial(num-1)
```

Example (factorial.py, del 2)

```
12
13  def main():
14      """test the functions in this module"""
15      num = input_type(int, "Enter a number: ")
16      print(f"{num}! = {factorial(num)}")
17
18  if __name__ == "__main__":
19      main()
```

Example (search.py, del 1)

```
5  def in_list(item, lst):
6      """ Check if item is in lst """
7      if len(lst) < 1:
8          return False
9      elif len(lst) == 1:
10         return lst[0] == item
11
12     middle = len(lst)//2
13     if item == lst[middle]:
14         return True
15     elif item < lst[middle]:
16         half_lst = lst[:middle] # lst[0:middle]
17     else:
18         half_lst = lst[middle+1:]
19     return in_list(item, half_lst)
```

Example (search.py, del 2)

```
 3  import input_type

    ...

21
22  def main():
23      """Test functionality"""
24      l = sorted([1, 2, 4, 5, 8, 10, 18, 20, 21, 22, 30])
25      x = input_type.input_type(int, "What to search for? ")
26      if in_list(x, l):
27          print("Yes!")
28      else:
29          print("No!")
30
31  if __name__ == "__main__":
32      main()
```

```
def gen():
    i = 0
    while True:
        yield i
        i += 1
```

Example (filter-own.py)

```
 7  def own_filter(f, lst):
 8      result = []
 9      for i in lst:
10          if f(i):
11              result.append(i)
12      return result
```

Example (filter-gen.py)

```
 7  def own_filter(f, lst):
 8      """filter elements of lst based on f"""
 9      for i in lst:
10          if f(i):
11              yield i
```

Example (filter-own.py)

```
7  def own_filter(f, lst):
8      result = []
9      for i in lst:
10         if f(i):
11             result.append(i)
12     return result
```

Example (filter-gen.py)

```
7  def own_filter(f, lst):
8      """filter elements of lst based on f"""
9      for i in lst:
10         if f(i):
11             yield i
```

Example (mapping-own.py)

```
16 def own_map(f, lst):
17     result = []
18     for i in lst:
19         result.append(f(i))
20     return result
```

Example (mapping-gen.py)

```
16 def own_map(f, lst):
17     """map i to f(i)"""
18     for i in lst:
19         yield f(i)
```

Example (mapping-own.py)

```
16 def own_map(f, lst):
17     result = []
18     for i in lst:
19         result.append(f(i))
20     return result
```

Example (mapping-gen.py)

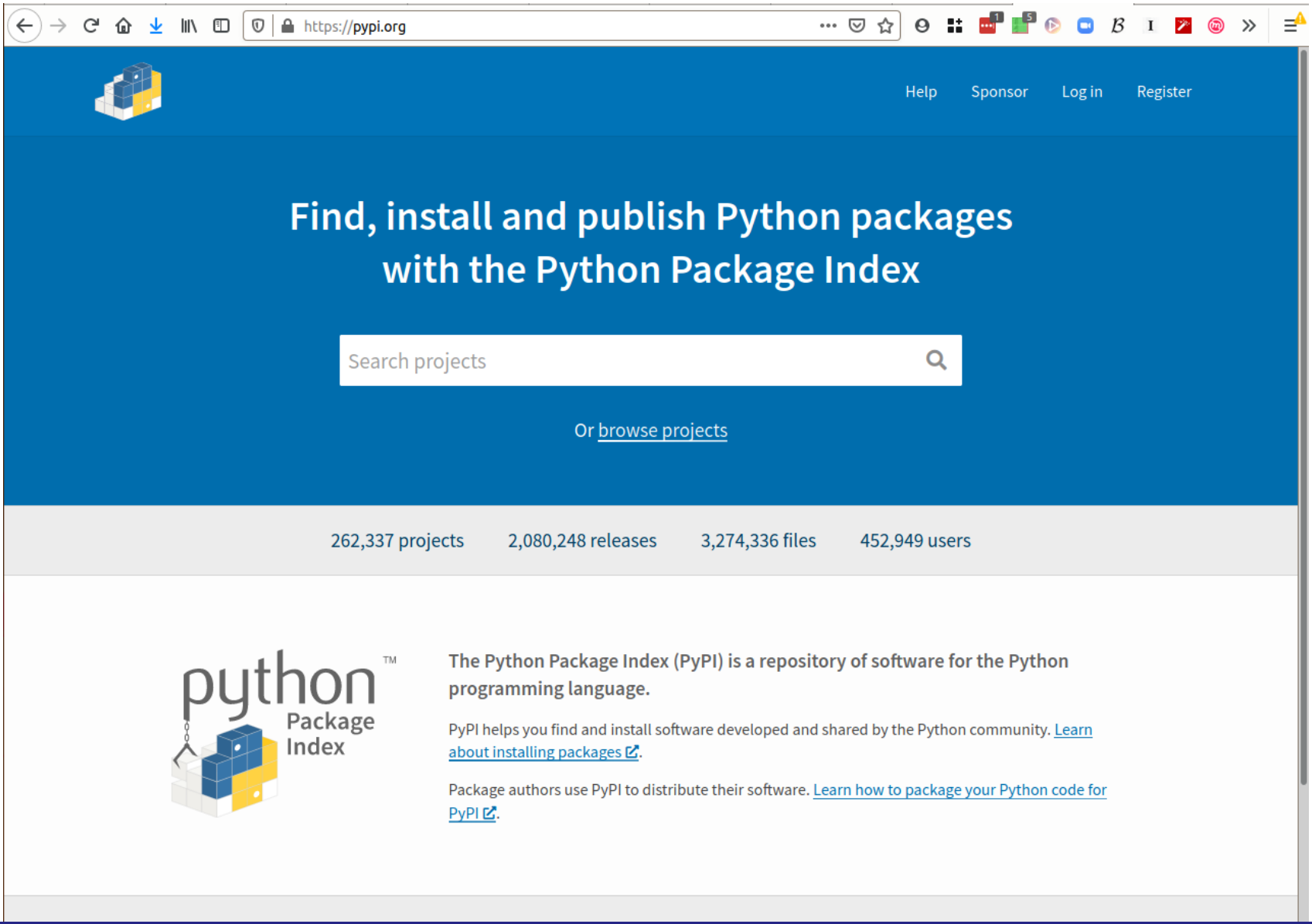
```
16 def own_map(f, lst):
17     """map i to f(i)"""
18     for i in lst:
19         yield f(i)
```

Example (gen-adv.py, del 1)

```
3  def map_nogen(func, lst):
4      result = []
5      for i in lst:
6          print(f"nogen {i} -> {func(i)}")
7          result.append(func(i))
8      return result
9
10 def map_gen(func, lst):
11     for i in lst:
12         print(f"gen {i} -> {func(i)}")
13         yield func(i)
```

Example (gen-adv.py, del 2)

```
15  def main():
16      l = [1, 2, 3, 4, 5]
17      f = lambda x: 2*x
18      for i in map_nogen(f, l):
19          print(i)
20          break
21      for i in map_gen(f, l):
22          print(i)
23          break
24
25  if __name__ == "__main__":
26      main()
```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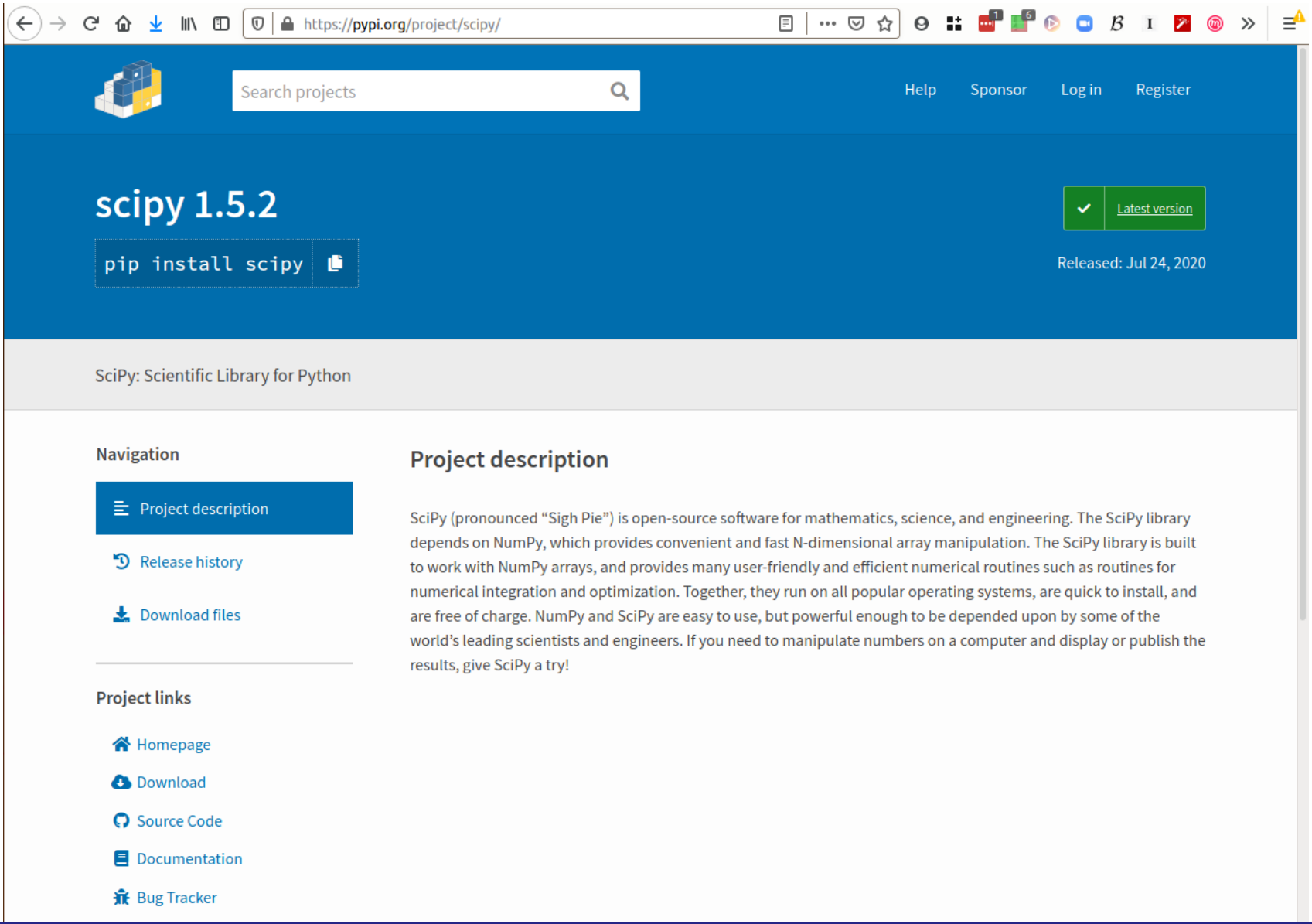
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Released: Jul 24, 2020
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Latest version
Released: Sep 15, 2020
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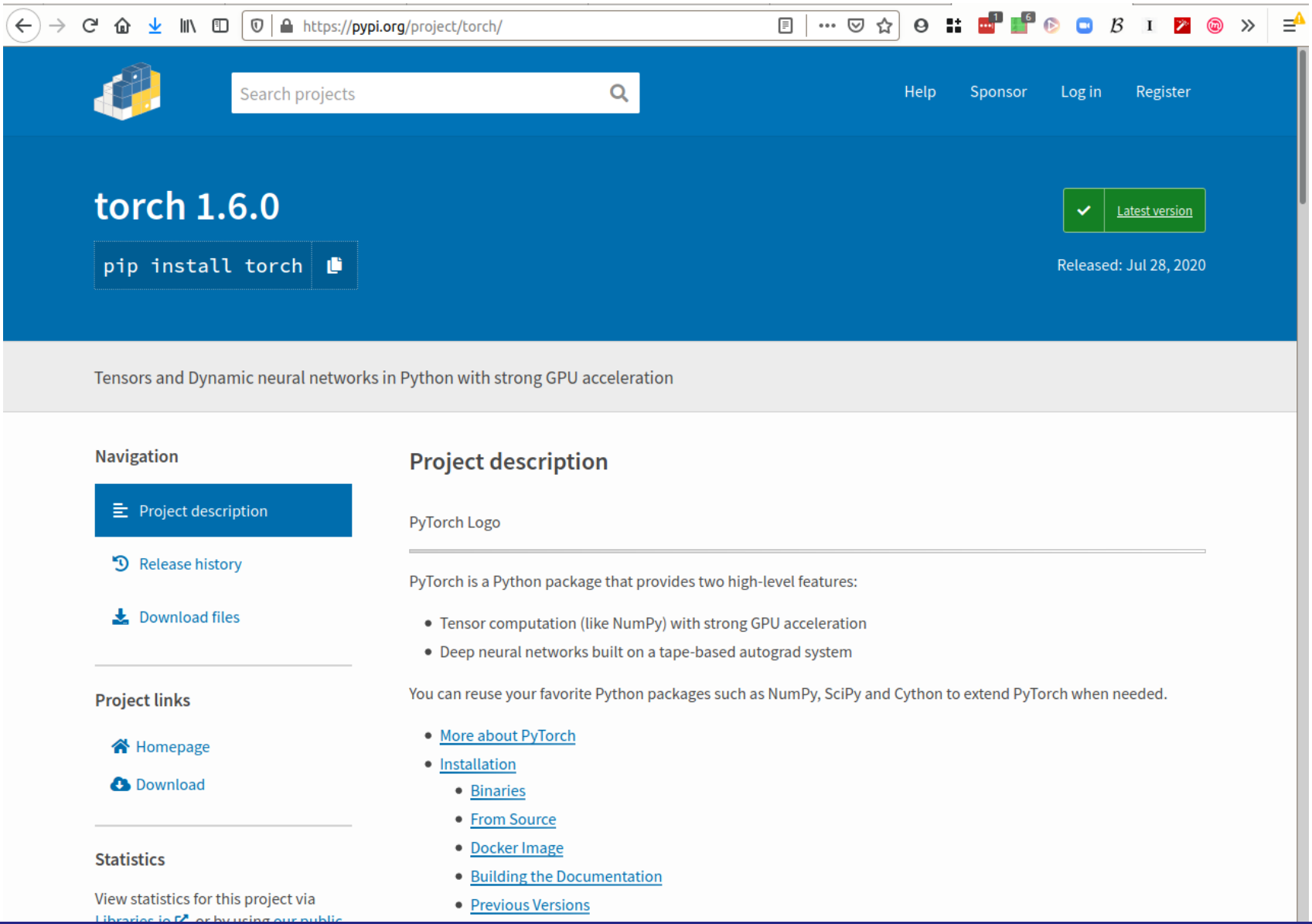
build passing
Azure Pipelines succeeded
build failing
codecov 83%
code quality: python A
matplotlib
Matplotlib is a comprehensive library for creating static, animated, and interactive visualizations in Python.
Check out our home page for more information.

Example (Installation)

```
$ pip install numpy scipy matplotlib
```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Released: Jul 28, 2020
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Deep neural networks built on a tape-based autograd system
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