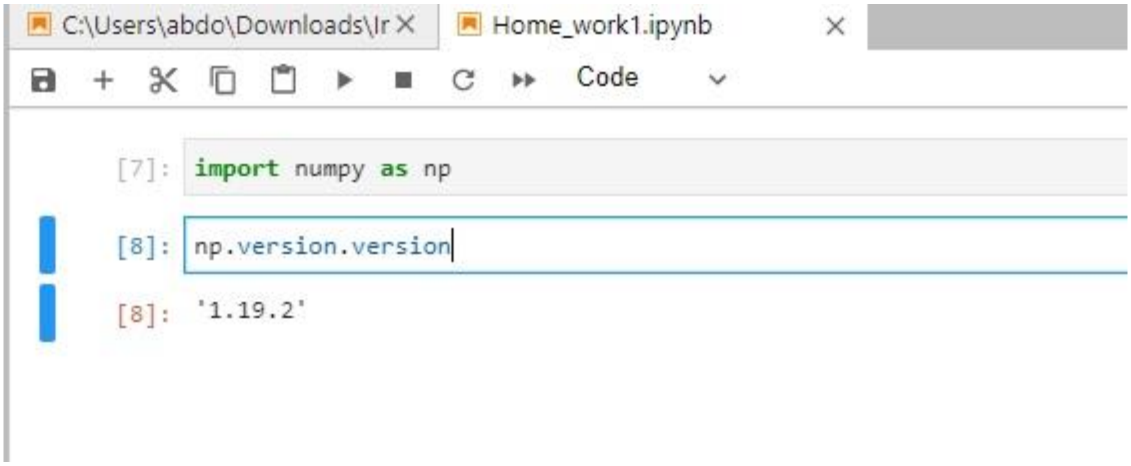
Home work 1 (Codes)

1- Write a NumPy code line(s) to get and print your numpy library version

Sol :

import numpy as np

np.version.version

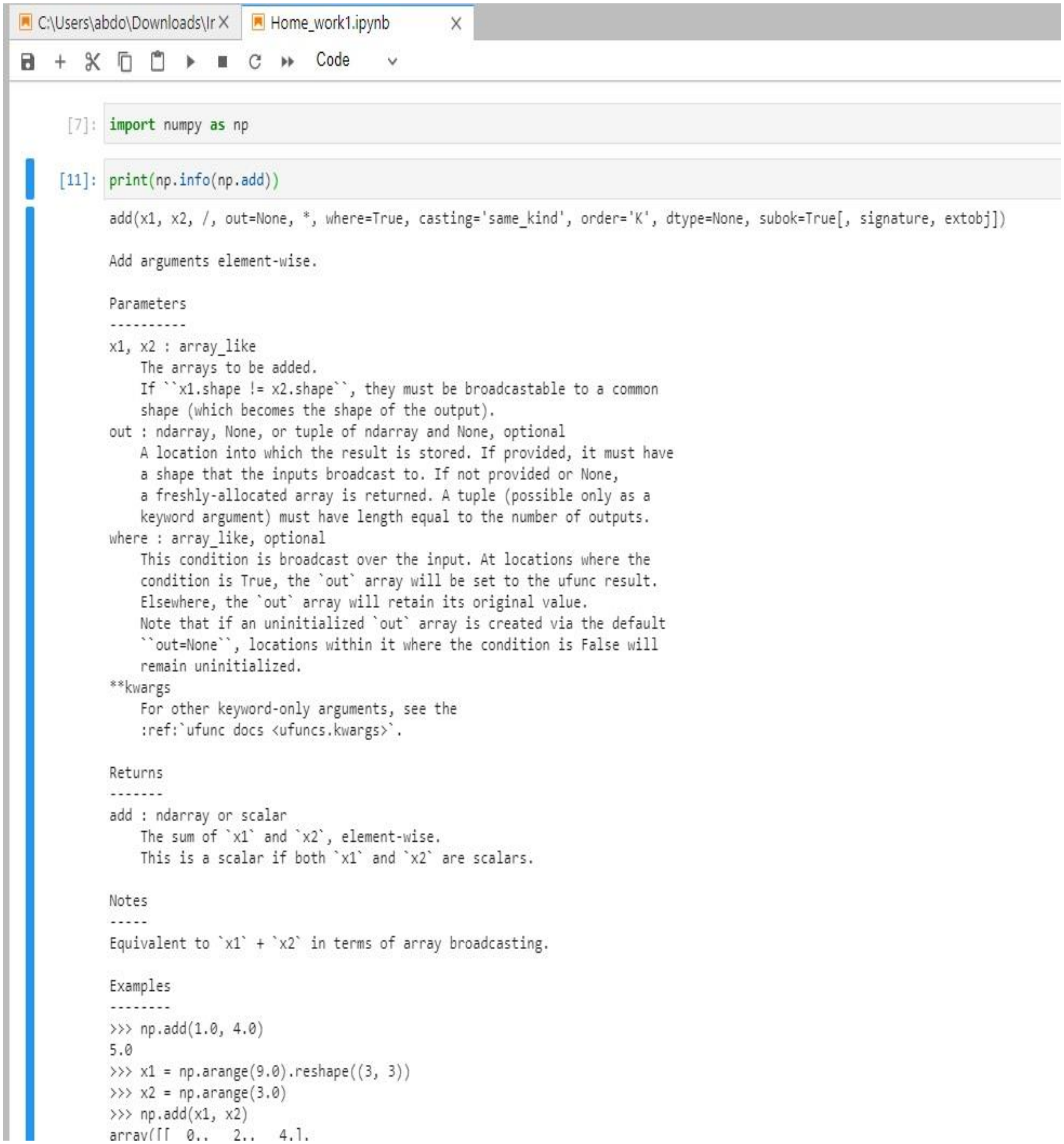


```
[7]: import numpy as np

[8]: np.version.version

[8]: '1.19.2'
```

2- Write a NumPy code line(s) to get help on the “add” function.

Sol:

import numpy as np
print(np.info(np.add))



```
[7]: import numpy as np
```

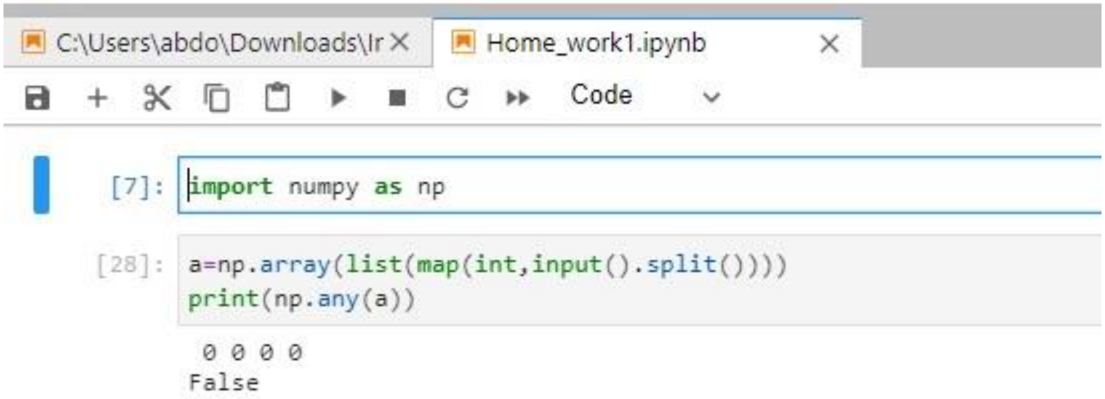
```
[11]: print(np.info(np.add))
```

```
add(x1, x2, /, out=None, *, where=True, casting='same_kind', order='K', dtype=None, subok=True[, signature, extobj])

Add arguments element-wise.

Parameters
----------
x1, x2 : array_like
    The arrays to be added.
    If ``x1.shape != x2.shape``, they must be broadcastable to a common
    shape (which becomes the shape of the output).
out : ndarray, None, or tuple of ndarray and None, optional
    A location into which the result is stored. If provided, it must have
    a shape that the inputs broadcast to. If not provided or None,
    a freshly-allocated array is returned. A tuple (possible only as a
    keyword argument) must have length equal to the number of outputs.
where : array_like, optional
    This condition is broadcast over the input. At locations where the
    condition is True, the `out` array will be set to the ufunc result.
    Elsewhere, the `out` array will retain its original value.
    Note that if an uninitialized `out` array is created via the default
    ``out=None``, locations within it where the condition is False will
    remain uninitialized.
**kwargs
    For other keyword-only arguments, see the
    :ref:`ufunc docs <ufuncs.kwargs>`.

Returns
-------
add : ndarray or scalar
    The sum of `x1` and `x2`, element-wise.
    This is a scalar if both `x1` and `x2` are scalars.

Notes
-----
Equivalent to `x1` + `x2` in terms of array broadcasting.

Examples
--------
>>> np.add(1.0, 4.0)
5.0
>>> x1 = np.arange(9.0).reshape((3, 3))
>>> x2 = np.arange(3.0)
>>> np.add(x1, x2)
array([[  0.,   2.,   4.],
```

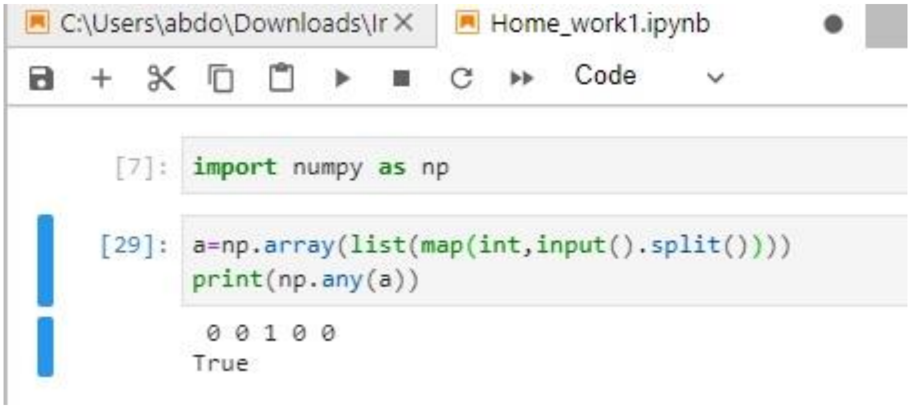
3- Write a NumPy code line(s) to test whether any of the elements of an input array is non-zero

Sol :

```
import numpy as np
a=np.array(list(map(int,input().split())))
print(np.any(a))
```



```
[7]: import numpy as np

[28]: a=np.array(list(map(int,input().split())))
      print(np.any(a))

 0 0 0 0
False
```

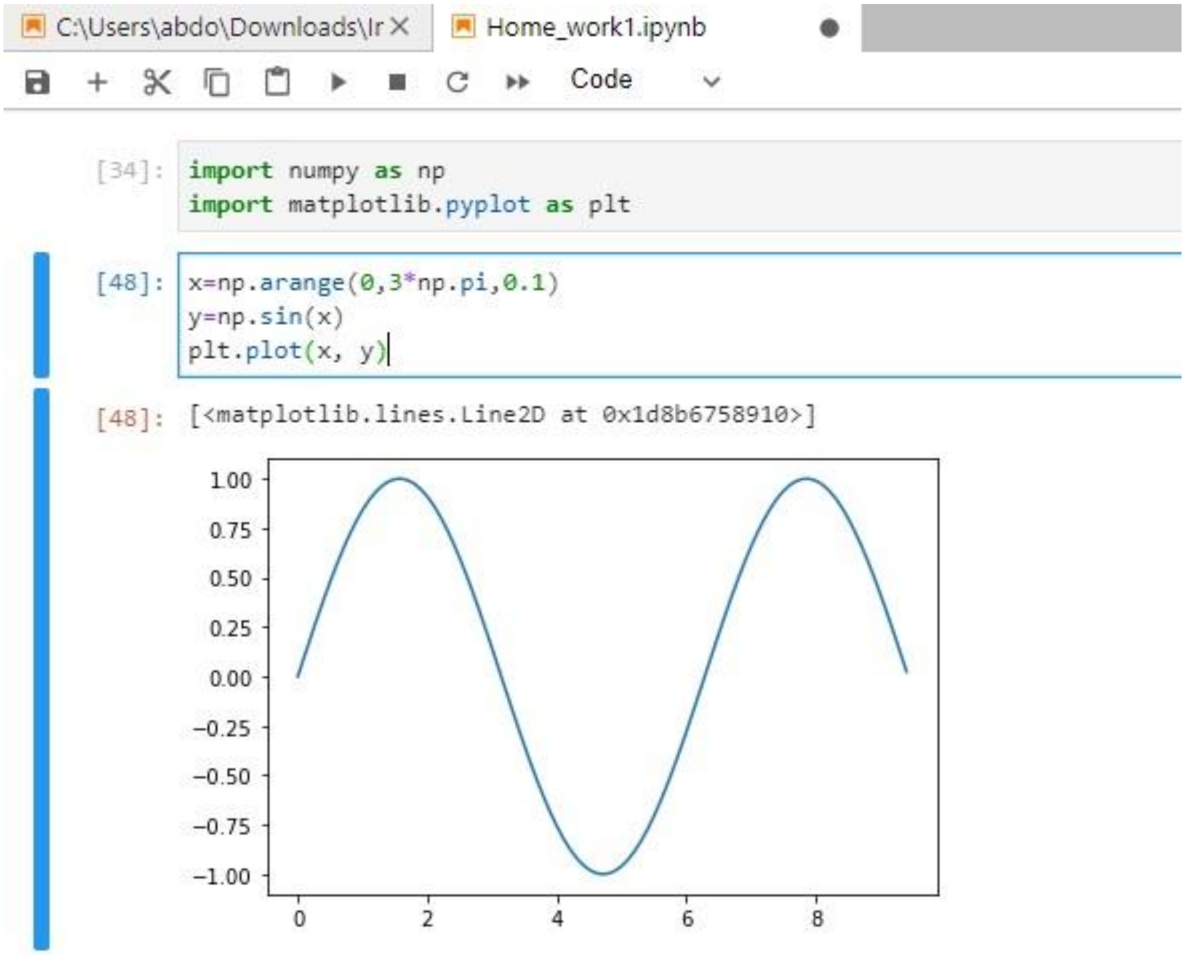


```
[7]: import numpy as np

[29]: a=np.array(list(map(int,input().split())))
      print(np.any(a))

 0 0 1 0 0
True
```

4- Write a NumPy code line(s) to compute the x and y coordinates for points on a sine curve and plot the points using matplotlib.

Sol:

```
import numpy as np
import matplotlib.pyplot as plt
x=np.arange(0,3*np.pi,0.1)
y=np.sin(x)
plt.plot(x, y)
```

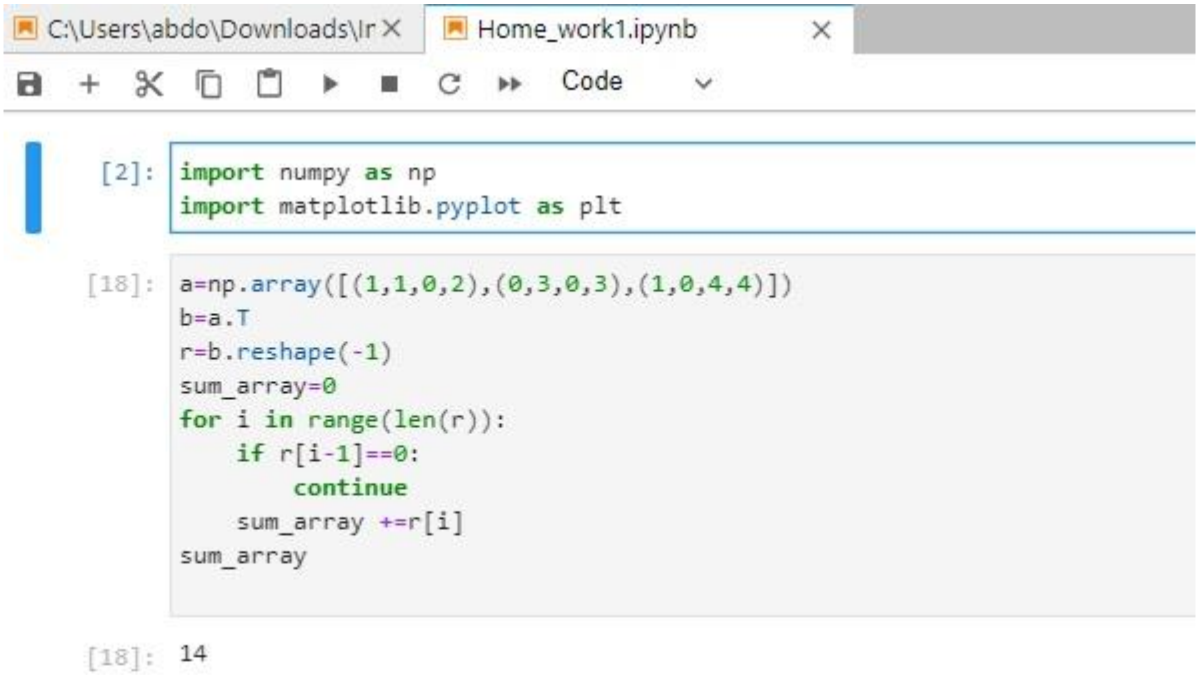


```
[34]: import numpy as np
      import matplotlib.pyplot as plt

[48]: x=np.arange(0,3*np.pi,0.1)
      y=np.sin(x)
      plt.plot(x, y)

[48]: [<matplotlib.lines.Line2D at 0x1d8b6758910>]
```

5- Write a NumPy code line(s) to add elements in a matrix. If an element in the matrix is 0, we will not add the element below this element (in red)

Sol:

```
import numpy as np
a=np.array([(1,1,0,2),(0,3,0,3),(1,0,4,4)])
b=a.T
r=b.reshape(-1)
sum_array=0
for i in range(len(r)):
   if r[i-1]==0:
      continue
   sum_array +=r[i]
sum_array
```



```
[2]: import numpy as np
     import matplotlib.pyplot as plt

[18]: a=np.array([(1,1,0,2),(0,3,0,3),(1,0,4,4)])
      b=a.T
      r=b.reshape(-1)
      sum_array=0
      for i in range(len(r)):
          if r[i-1]==0:
              continue
          sum_array +=r[i]
      sum_array

[18]: 14
```

6- Write a NumPy code line(s) to extract all numbers which are less and greater than a specified integer in an input array

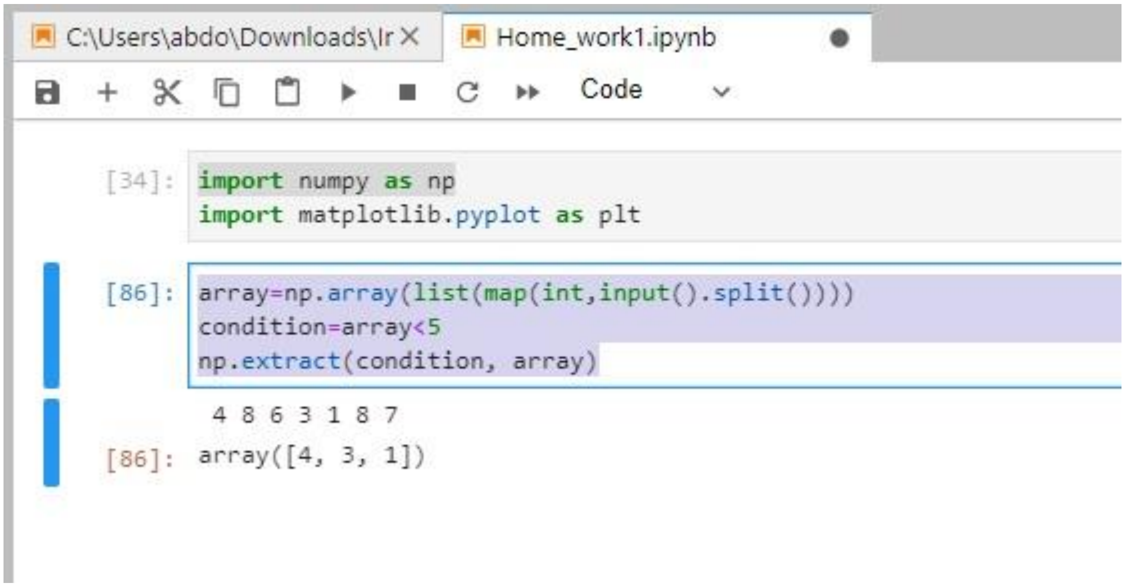
Sol:

import numpy as np

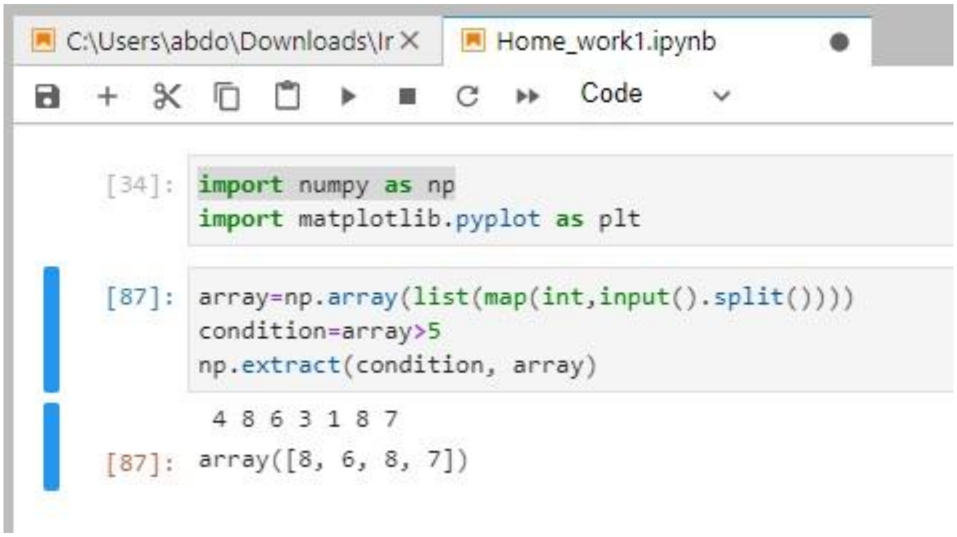
array=np.array(list(map(int,input().split())))

condition=array<5

np.extract(condition, array)



```
[34]: import numpy as np
      import matplotlib.pyplot as plt

[86]: array=np.array(list(map(int,input().split())))
      condition=array<5
      np.extract(condition, array)

       4 8 6 3 1 8 7
[86]: array([4, 3, 1])
```

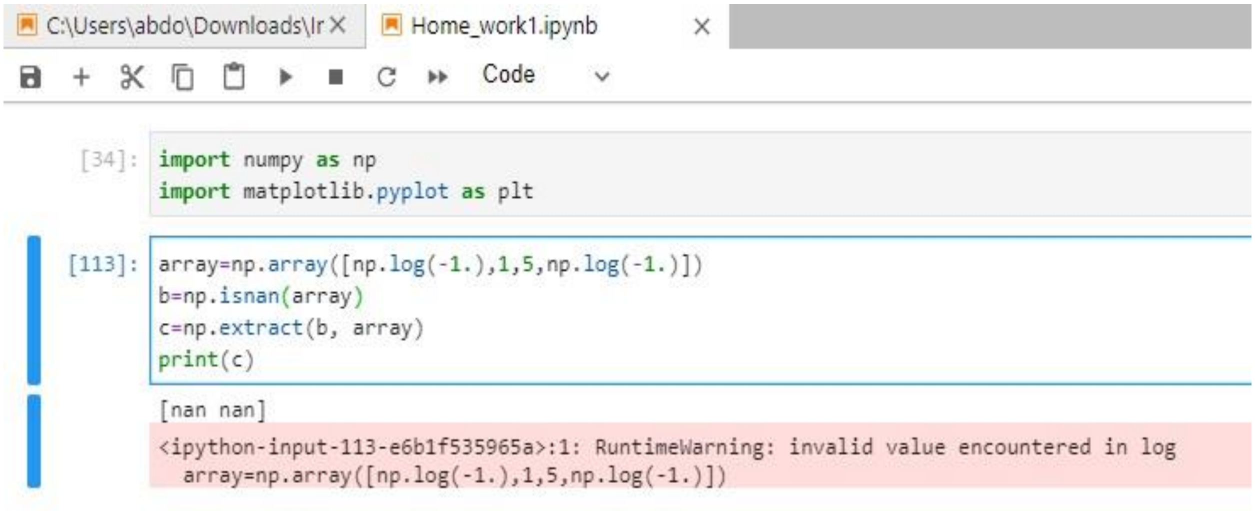


```
[34]: import numpy as np
      import matplotlib.pyplot as plt

[87]: array=np.array(list(map(int,input().split())))
      condition=array>5
      np.extract(condition, array)

       4 8 6 3 1 8 7
[87]: array([8, 6, 8, 7])
```

7- Write a NumPy code line(s) to find the missing (hint: undefined) data in an input array

Sol:

```
import numpy as np
array=np.array([np.log(-1.),1,5,np.log(-1.)])
b=np.isnan(array)
c=np.extract(b, array)
print(c)
```



```
[34]: import numpy as np
      import matplotlib.pyplot as plt
```

```
[113]: array=np.array([np.log(-1.),1,5,np.log(-1.)])
       b=np.isnan(array)
       c=np.extract(b, array)
       print(c)
```

```
[nan nan]
<ipython-input-113-e6b1f535965a>:1: RuntimeWarning: invalid value encountered in log
  array=np.array([np.log(-1.),1,5,np.log(-1.)])
```