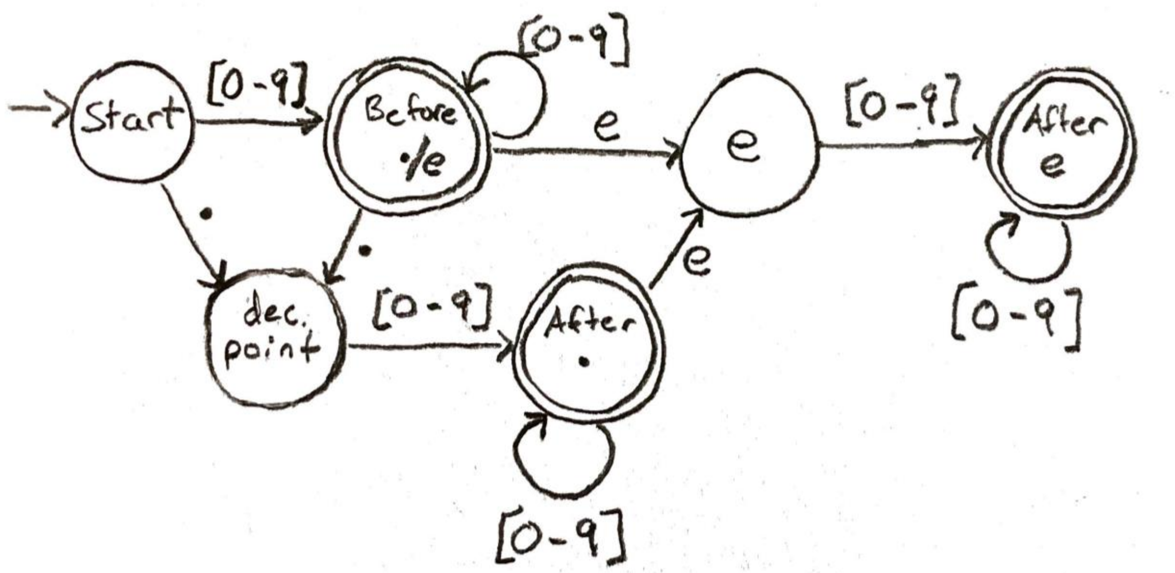
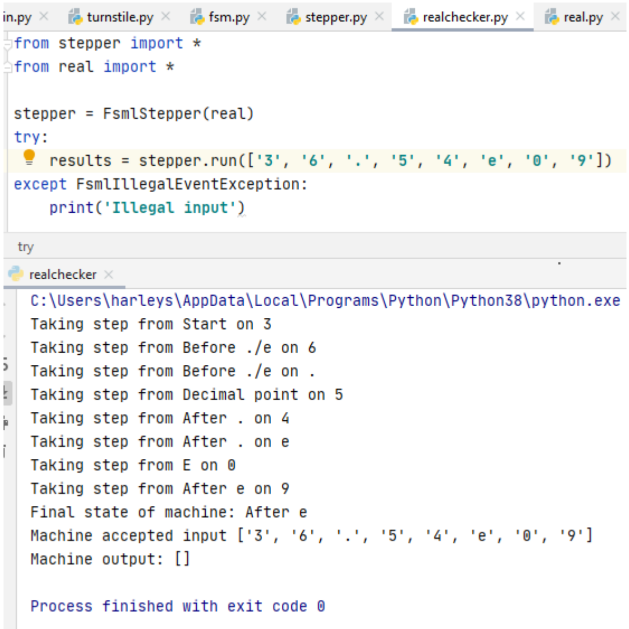
Stuart Harley

Assignment 1

FSM for a machine accepting unsigned real numbers:



Test Output:

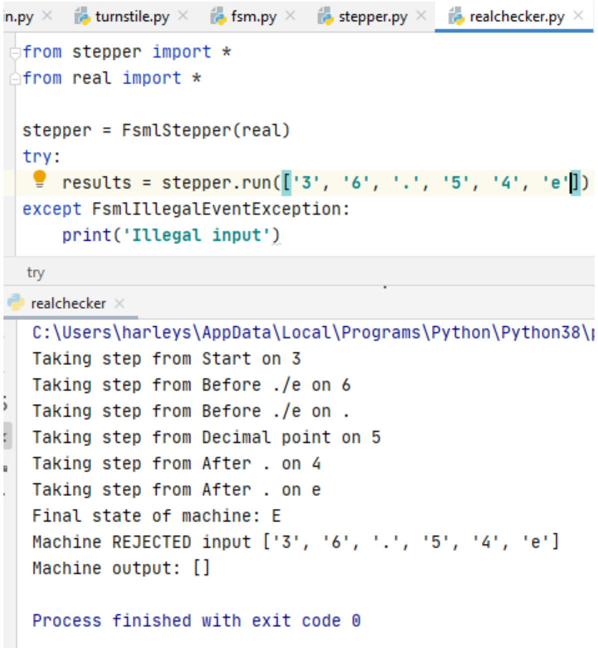


```
from stepper import *
from real import *

stepper = FsmlStepper(real)
try:
    results = stepper.run(['3', '6', '.', '5', '4', 'e', '0', '9'])
except FsmlIllegalEventException:
    print('Illegal input')
```

```
C:\Users\harleys\AppData\Local\Programs\Python\Python38\python.exe
Taking step from Start on 3
Taking step from Before ./e on 6
Taking step from Before ./e on .
Taking step from Decimal point on 5
Taking step from After . on 4
Taking step from After . on e
Taking step from E on 0
Taking step from After e on 9
Final state of machine: After e
Machine accepted input ['3', '6', '.', '5', '4', 'e', '0', '9']
Machine output: []

Process finished with exit code 0
```

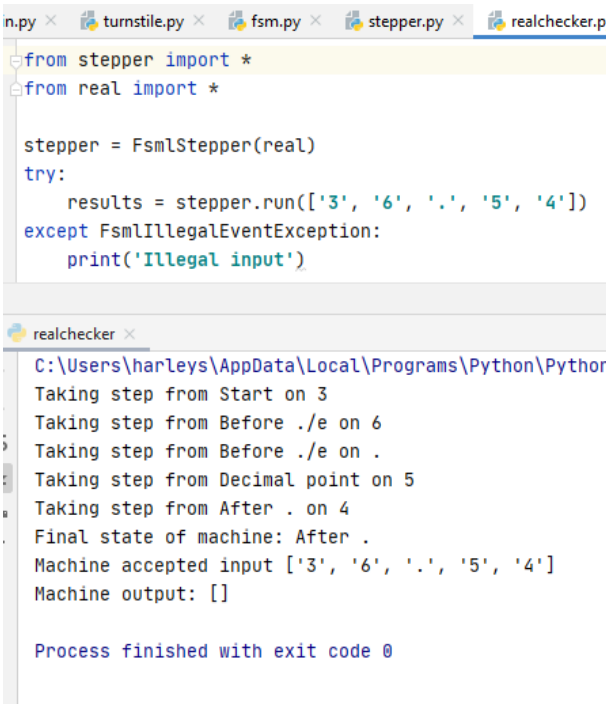


```
from stepper import *
from real import *

stepper = FsmlStepper(real)
try:
    results = stepper.run(['3', '6', '.', '5', '4', 'e'])
except FsmlIllegalEventException:
    print('Illegal input')
```

```
C:\Users\harleys\AppData\Local\Programs\Python\Python38\
Taking step from Start on 3
Taking step from Before ./e on 6
Taking step from Before ./e on .
Taking step from Decimal point on 5
Taking step from After . on 4
Taking step from After . on e
Final state of machine: E
Machine REJECTED input ['3', '6', '.', '5', '4', 'e']
Machine output: []

Process finished with exit code 0
```

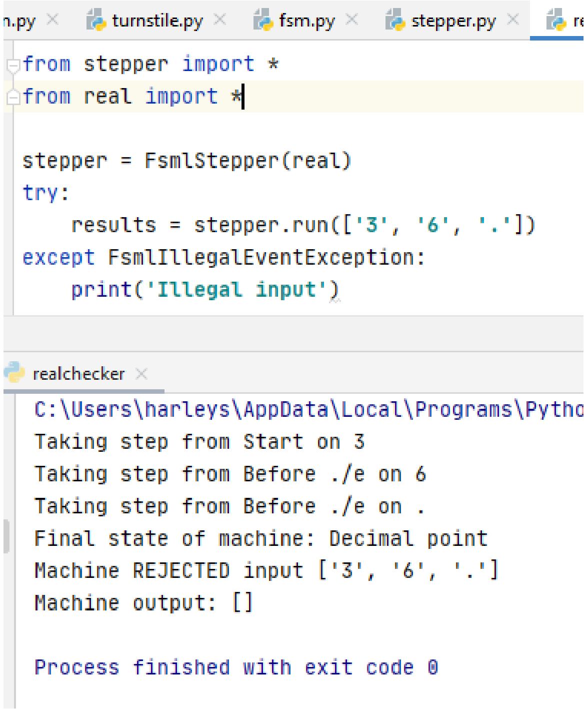


```
from stepper import *
from real import *

stepper = FsmlStepper(real)
try:
    results = stepper.run(['3', '6', '.', '5', '4'])
except FsmlIllegalEventException:
    print('Illegal input')
```

```
C:\Users\harleys\AppData\Local\Programs\Python\Pythor
Taking step from Start on 3
Taking step from Before ./e on 6
Taking step from Before ./e on .
Taking step from Decimal point on 5
Taking step from After . on 4
Final state of machine: After .
Machine accepted input ['3', '6', '.', '5', '4']
Machine output: []

Process finished with exit code 0
```

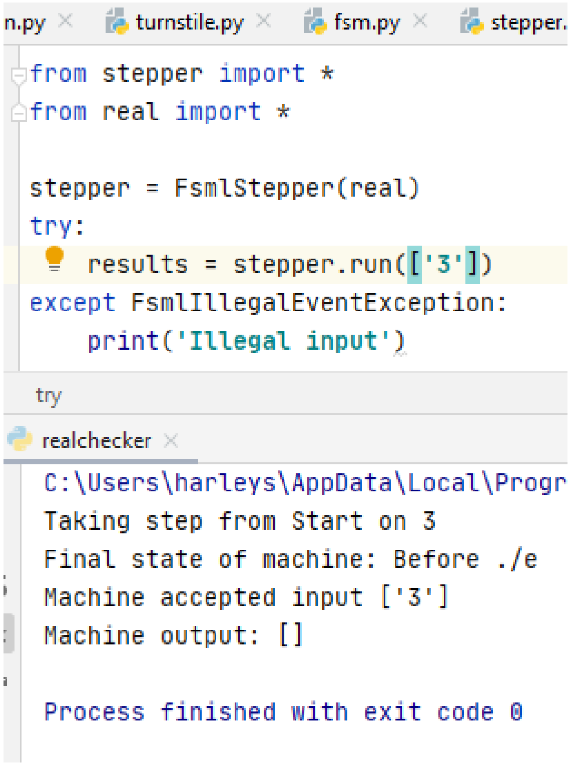


```
from stepper import *
from real import *

stepper = FsmlStepper(real)
try:
    results = stepper.run(['3', '6', '.'])
except FsmlIllegalEventException:
    print('Illegal input')
```

```
C:\Users\harleys\AppData\Local\Programs\Pytho
Taking step from Start on 3
Taking step from Before ./e on 6
Taking step from Before ./e on .
Final state of machine: Decimal point
Machine REJECTED input ['3', '6', '.']
Machine output: []

Process finished with exit code 0
```

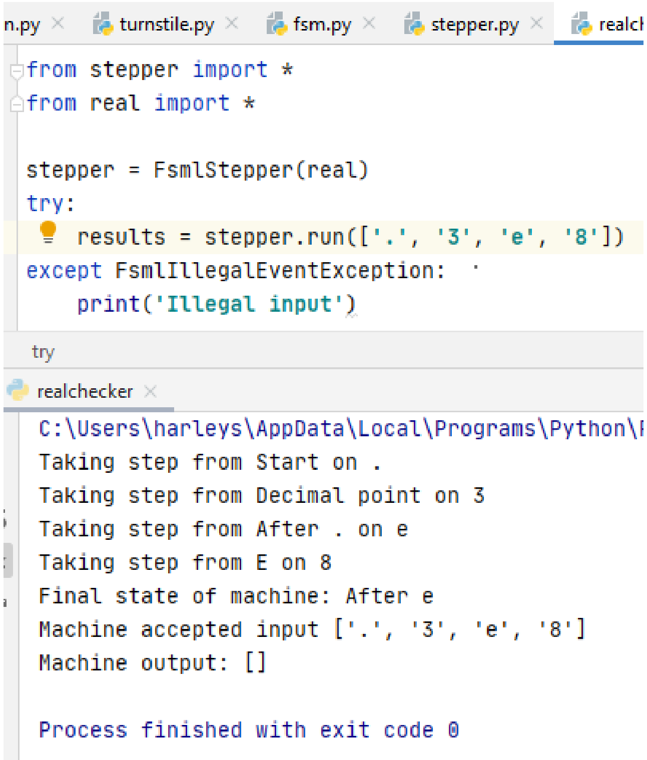


```
from stepper import *
from real import *

stepper = FsmlStepper(real)
try:
    results = stepper.run(['3'])
except FsmlIllegalEventException:
    print('Illegal input')
```

```
C:\Users\harleys\AppData\Local\Progr
Taking step from Start on 3
Final state of machine: Before ./e
Machine accepted input ['3']
Machine output: []

Process finished with exit code 0
```

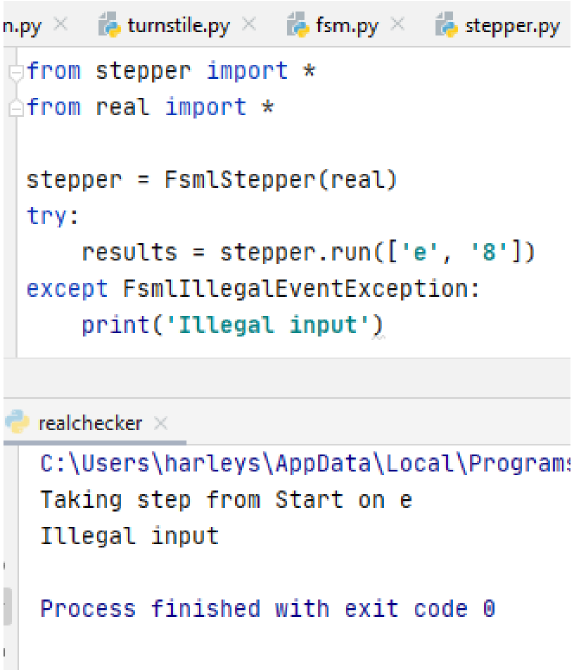


```
from stepper import *
from real import *

stepper = FsmlStepper(real)
try:
    results = stepper.run(['.', '3', 'e', '8'])
except FsmlIllegalEventException:
    print('Illegal input')
```

```
C:\Users\harleys\AppData\Local\Programs\Python\F
Taking step from Start on .
Taking step from Decimal point on 3
Taking step from After . on e
Taking step from E on 8
Final state of machine: After e
Machine accepted input ['.', '3', 'e', '8']
Machine output: []

Process finished with exit code 0
```

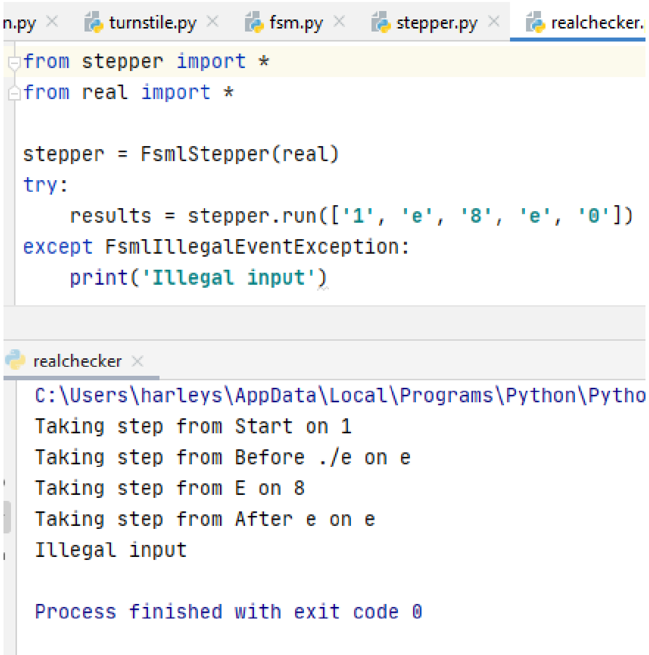


```
from stepper import *
from real import *

stepper = FsmlStepper(real)
try:
    results = stepper.run(['e', '8'])
except FsmlIllegalEventException:
    print('Illegal input')
```

```
C:\Users\harleys\AppData\Local\Programs
Taking step from Start on e
Illegal input

Process finished with exit code 0
```

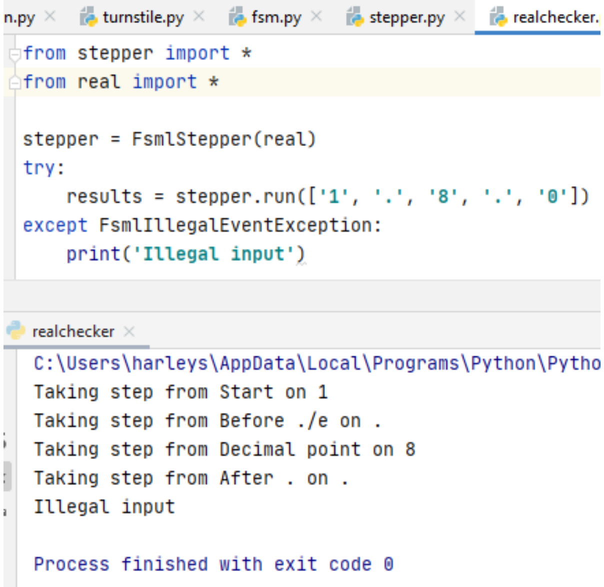


```
from stepper import *
from real import *

stepper = FsmlStepper(real)
try:
    results = stepper.run(['1', 'e', '8', 'e', '0'])
except FsmlIllegalEventException:
    print('Illegal input')
```

```
C:\Users\harleys\AppData\Local\Programs\Python\Pytho
Taking step from Start on 1
Taking step from Before ./e on e
Taking step from E on 8
Taking step from After e on e
Illegal input

Process finished with exit code 0
```

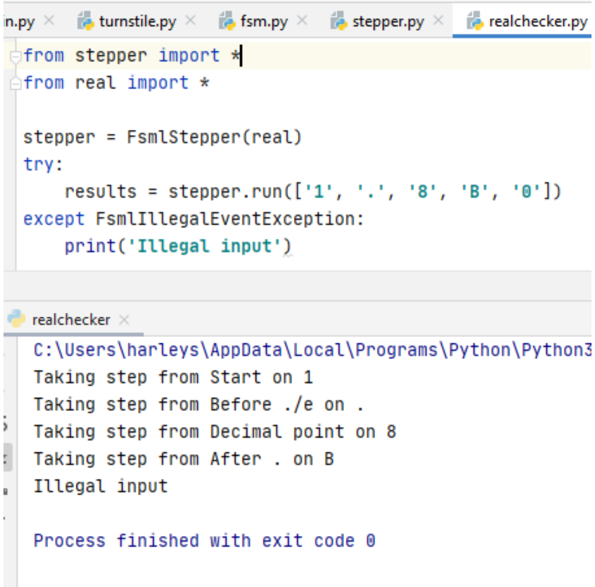


```
from stepper import *
from real import *

stepper = FsmlStepper(real)
try:
    results = stepper.run(['1', '.', '8', '.', '0'])
except FsmlIllegalEventException:
    print('Illegal input')
```

```
C:\Users\harleys\AppData\Local\Programs\Python\Pytho
Taking step from Start on 1
Taking step from Before ./e on .
Taking step from Decimal point on 8
Taking step from After . on .
Illegal input

Process finished with exit code 0
```

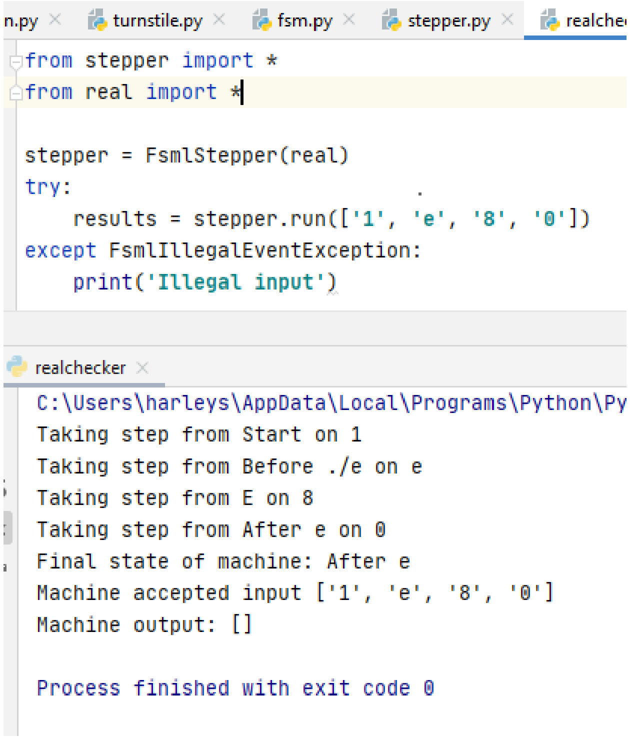


```
from stepper import *
from real import *

stepper = FsmlStepper(real)
try:
    results = stepper.run(['1', '.', '8', 'B', '0'])
except FsmlIllegalEventException:
    print('Illegal input')
```

```
C:\Users\harleys\AppData\Local\Programs\Python\Python3
Taking step from Start on 1
Taking step from Before ./e on .
Taking step from Decimal point on 8
Taking step from After . on B
Illegal input

Process finished with exit code 0
```

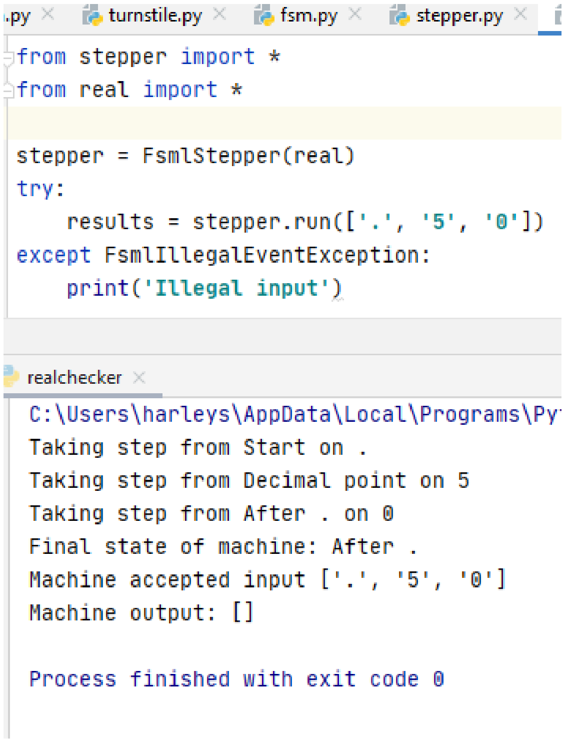


```
from stepper import *
from real import *

stepper = FsmlStepper(real)
try:
    results = stepper.run(['1', 'e', '8', '0'])
except FsmlIllegalEventException:
    print('Illegal input')
```

```
C:\Users\harleys\AppData\Local\Programs\Python\Py
Taking step from Start on 1
Taking step from Before ./e on e
Taking step from E on 8
Taking step from After e on 0
Final state of machine: After e
Machine accepted input ['1', 'e', '8', '0']
Machine output: []

Process finished with exit code 0
```

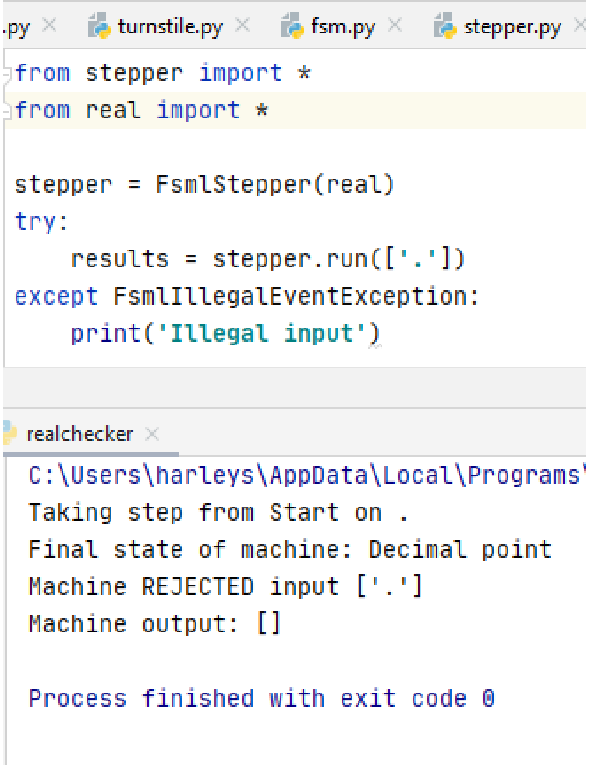


```
from stepper import *
from real import *

stepper = FsmlStepper(real)
try:
    results = stepper.run(['.', '5', '0'])
except FsmlIllegalEventException:
    print('Illegal input')
```

```
C:\Users\harleys\AppData\Local\Programs\Py
Taking step from Start on .
Taking step from Decimal point on 5
Taking step from After . on 0
Final state of machine: After .
Machine accepted input ['.', '5', '0']
Machine output: []

Process finished with exit code 0
```

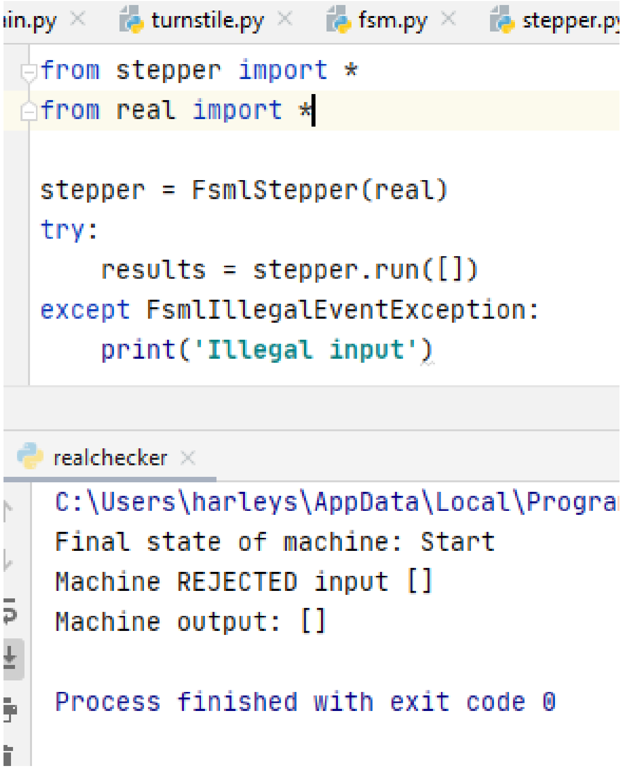


```
from stepper import *
from real import *

stepper = FsmlStepper(real)
try:
    results = stepper.run(['.'])
except FsmlIllegalEventException:
    print('Illegal input')
```

```
C:\Users\harleys\AppData\Local\Programs'
Taking step from Start on .
Final state of machine: Decimal point
Machine REJECTED input ['.']
Machine output: []

Process finished with exit code 0
```

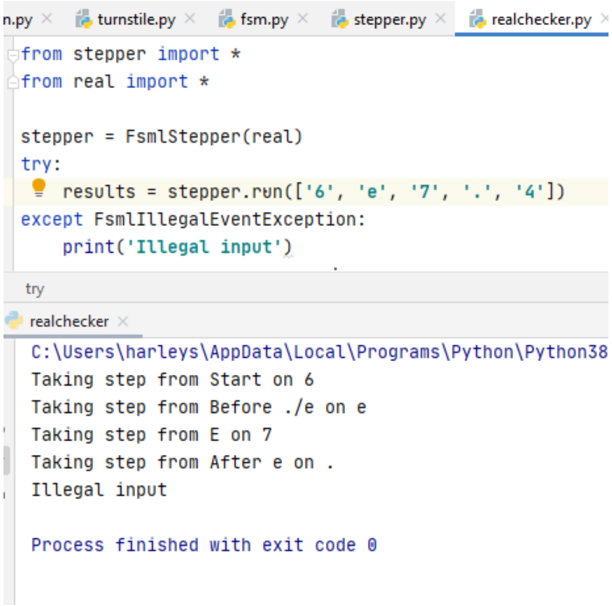


```
from stepper import *
from real import *

stepper = FsmlStepper(real)
try:
    results = stepper.run([])
except FsmlIllegalEventException:
    print('Illegal input')
```

```
C:\Users\harleys\AppData\Local\Progra
Final state of machine: Start
Machine REJECTED input []
Machine output: []

Process finished with exit code 0
```



```
from stepper import *
from real import *

stepper = FsmlStepper(real)
try:
    results = stepper.run(['6', 'e', '7', '.', '4'])
except FsmlIllegalEventException:
    print('Illegal input')
```

```
C:\Users\harleys\AppData\Local\Programs\Python\Python38
Taking step from Start on 6
Taking step from Before ./e on e
Taking step from E on 7
Taking step from After e on .
Illegal input

Process finished with exit code 0
```

Analysis of Tests:

These inputs were accepted by the machine: 36.54e09, 36.54, 3, .3e8, 1e80, .50

These inputs were rejected by the machine because they ended in a non-final state: 36.54e, 36., . (just a decimal point), and the empty string.

These inputs threw a FsmlIllegalEventException, and so it was caught and “Illegal Input” was outputted: e8, 1e8e0, 1.8.0, 1.8B0, 6e7.4

I believe that these test cases capture every possible path through the real FSM, and each test behaves as it should. Valid inputs that ended in a final state were accepted. Valid inputs that ended in a non-final state were rejected by the machine. And non-valid inputs threw an exception which was caught and dealt with accordingly.