

2014-04-14.sagews

April 16, 2014

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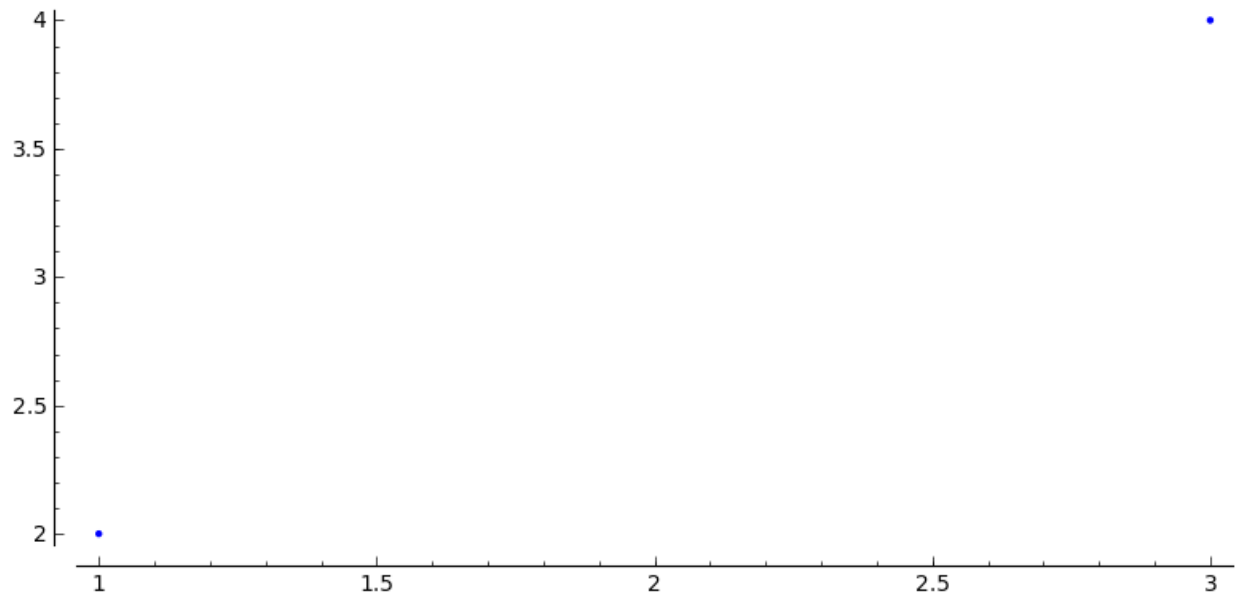
1 Math 480b Sage Course

1.1 April 14, 2014

Screencast: http://youtu.be/fualtE_GcuY
Plan

- Questions?
- Homework discussion:
 - Youll find a folder grading/homework2 in your project. Grade the three assignments.
 - Youll find a new assignment in homework3/
 - Weve collected the homework you graded and are looking at it.
- Python
 - exception handling: try/except/finally
 - classes: creating your own data types
 - decorators

```
points([(1,2), (3,4)])
```



1.2 Exception Handling

try/except/finally

```
try:
    a = 2 + 2
    b = 3/4
    c = 0
    d = a/c
    print "nothing bad happened"
except:    # naked exceptionn
    print "something bad happened"
finally:
    print "clean stuff up"
something bad happened
clean stuff up
```

```
a
b
c
d
4
3/4
0
Error in lines 4-4
Traceback (most recent call last):
  File "/projects/edf7b34d-8ef9-49ad-b83f-8fa4cde53380/.sagemathcloud/sage_server.py",
line 733, in execute
    exec compile(block+'\n', '', 'single') in namespace, locals
  File "", line 1, in <module>
```

```
NameError: name 'd' is not defined
```

```
1/0/0
```

```
Error in lines 1-1
```

```
Traceback (most recent call last):
```

```
File "/projects/edf7b34d-8ef9-49ad-b83f-8fa4cde53380/.sagemathcloud/sage_server.py",  
line 733, in execute
```

```
    exec compile(block+'\n', '', 'single') in namespace, locals
```

```
File "", line 1, in <module>
```

```
File "element.pyx", line 1811, in sage.structure.element.RingElement.__div__  
(sage/structure/element.c:15184)
```

```
File "integer.pyx", line 1797, in sage.rings.integer.Integer._div_  
(sage/rings/integer.c:13165)
```

```
File "integer_ring.pyx", line 430, in sage.rings.integer_ring.IntegerRing_class._div  
(sage/rings/integer_ring.c:5780)
```

```
ZeroDivisionError: Rational division by zero
```

```
prod = 5
```

```
prod([1,2,3])
```

```
Error in lines 2-2
```

```
Traceback (most recent call last):
```

```
File "/projects/edf7b34d-8ef9-49ad-b83f-8fa4cde53380/.sagemathcloud/sage_server.py",  
line 733, in execute
```

```
    exec compile(block+'\n', '', 'single') in namespace, locals
```

```
File "", line 1, in <module>
```

```
TypeError: 'sage.rings.integer.Integer' object is not callable
```

```
reset('prod')
```

```
prod([1,2,3])
```

```
6
```

```
reset('NameError')
```

```
NameError
```

```
<type 'exceptions.NameError'>
```

```
try:
```

```
    a = 2 + 2
```

```
    b = 3/4
```

```
    c = 0 + fubar
```

```
    d = a/c
```

```
    print "nothing bad happened"
```

```
except ZeroDivisionError, msg:
```

```
    print "somebody divided by 0: %s"%msg
```

```
except (ZeroDivisionError, NameError, ValueError), msg:
```

```
    print "somebody divided by 0 or ..."
```

```
    print "somebody used a variable that isn't defined"
```

```
    print "or something else..."
```

```
finally:
```

```
    print "clean stuff up"
```

```

clean stuff up
Error in lines 1-14
Traceback (most recent call last):
  File "/projects/edf7b34d-8ef9-49ad-b83f-8fa4cde53380/.sagemathcloud/sage_server.py",
line 733, in execute
    exec compile(block+'\n', '', 'single') in namespace, locals
  File "", line 4, in <module>
NameError: name 'fubar' is not defined

```

```

ZeroDivisionError
<type 'exceptions.ZeroDivisionError'>

```

```

NameError
ZeroDivisionError('Rational division by zero',)

```

1.3 Python classes

```

class Hour:
    def __init__(self, hour, am): # underscoreunderscore=dunder
        self.hour = Integer(hour)
        if self.hour <=0 or self.hour >= 13:
            raise ValueError("hour must be between 1 and 12")
        self.am = bool(am)
    def __repr__(self):
        return "%s%s"%(self.hour, "am" if self.am else "pm")
    def military(self):
        return (self.hour + (0 if self.am else 12))%24
    def __add__(self, right):
        n = self.military() + right.military()
        hour = n%12
        if hour == 0:
            hour += 12
        return Hour(hour, n%24 < 12) # am/pm is RIGHT

```

```
n = 78
```

```
n.military() # BOOM
```

```
h = Hour(7, False)
```

```
h
```

```
7pm
```

```
h.
```

```
h.military()
```

```
19
```

```
Hour(1, False) + Hour(3, False)
```

```
4am
```

```
h = Hour(1, False)
```

```
h
1pm

h + Hour(11, False)
12pm

h.hour
1

h.am
False
```