Strings
Return Methods

What is a String?

```
String s = "compsci";
```

	0	1	2	3	4	5	6
s	c	o	m	p	s	c	i

A string is a group of characters.
The first character in the group is at spot 0.

String Constructors

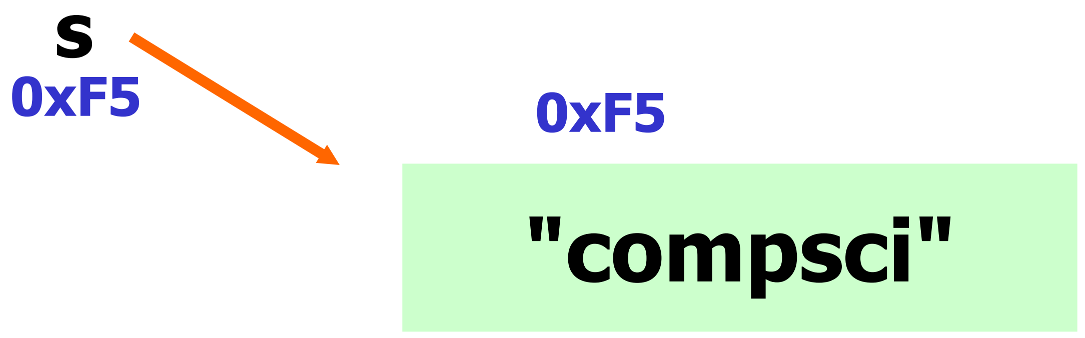
```
String s = "compsci";
String champ = new String("uilstate");
```

reference variable

object instantiation

What is a String?

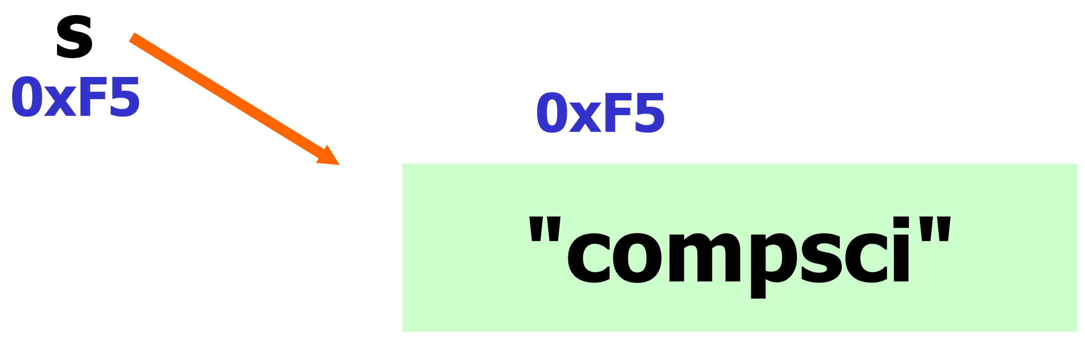
String s = "compsci";



A reference variable stores the memory address of an object.

What is a String?

```
String s = new String("compsci");
```

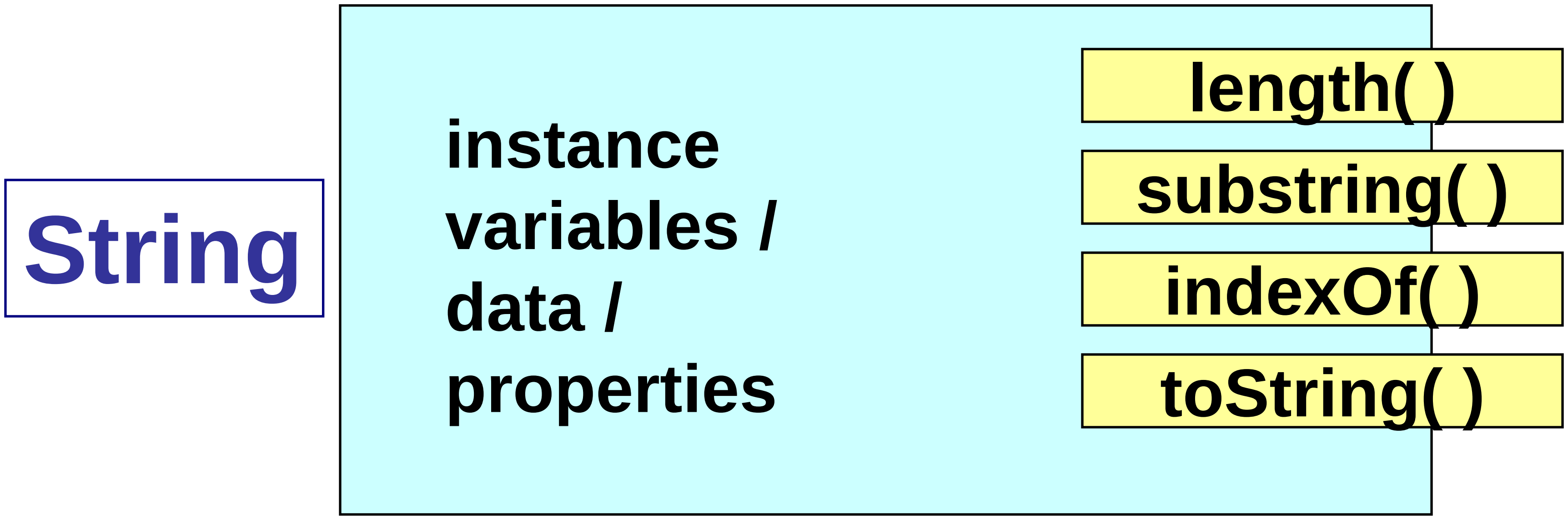


A reference variable stores the memory address of an object.

Open basics.java

Methods

Methods provide / grant access to an object's data / properties.



String

frequently used methods

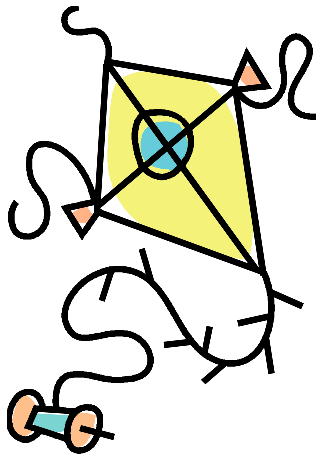
Name	Use
substring(x,y)	returns a section of the string from x to y not including y
substring(x)	returns a section of the string from x to length-1
length()	returns the # of chars
charAt(x)	returns the char at spot x
indexOf(c)	returns the loc of char c in the string, searching from spot 0 to spot length-1
lastIndexOf(c)	returns the loc of char c in the string, searching from spot length-1 to spot 0

length()

```
String s = "compsci";
int len = s.length();
System.out.println( len );
```

OUTPUT

```
7
```



	0	1	2	3	4	5	6
s	c	o	m	p	s	c	i

Return Methods

Return methods perform some action and return a result back.
.length() is a return method.

```
String s = "compsci";
int len = s.length();
System.out.println( len );
```

length() returns an integer back to the calling location.
The value returned is then assigned to variable len.

charAt()

```
String s = "compsci";

out.print(s.charAt(0) + " ");
out.print(s.charAt(2) + " ");
out.println(s.charAt(6));
```

OUTPUT

```
c m i
```

	0	1	2	3	4	5	6
s	c	o	m	p	s	c	i

Open
length.java

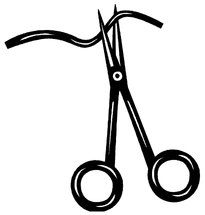
Open charat.java

substring()

```
String s = "compsci";
String sub ="";

sub = s.substring(3);
out.println(sub);

sub = s.substring(0,3);
out.println(sub);

sub = s.substring(4);
out.println(sub);
```

OUTPUT

```
psci
com
sci
```



	0	1	2	3	4	5	6
s	c	o	m	p	s	c	i

substring()

```
String s = "compsci";
String sub ="";

sub = s.substring(2);
out.println(sub);

sub = s.substring(2,5);
out.println(sub);

sub = s.substring(4,6);
out.println(sub);
```

OUTPUT

```
mpsci
mps
sc
```

	0	1	2	3	4	5	6
s	c	o	m	p	s	c	i

Open substring.java

indexOf()

```
String s = "compsci";
int index = s.indexOf("mp");
out.println(index);
index = s.indexOf("c");
out.println(index);
index = s.indexOf("x");
out.println(index);
```

OUTPUT

```
2
0
-1
```

	0	1	2	3	4	5	6
s	c	o	m	p	s	c	i

indexOf()

```
String s = "compsci";
int index = s.indexOf("pm");
out.println(index);
index = s.lastIndexOf("c");
out.println(index);
index = s.lastIndexOf("omp");
out.println(index);
```

OUTPUT

```
-1
5
1
```

	0	1	2	3	4	5	6
s	c	o	m	p	s	c	i

Open indexof.java

Complete the code

concatenate

```
String one = "computer";
String two = "-sci";
String s = one.substring(0,4) + two;
out.println(s);
out.println(s.length());
```

OUTPUT

```
comp-sci
8
```

Concatenate is the process of combining strings together to make a new string.

Open concatenate.java

Start work on the labs

return methods expanded

Return Methods

Return methods perform some action and return a result back to the calling location.

```
int num = keyboard.nextInt();
```

nextInt() returns an int back to the calling location.

The value returned is assigned to num.

Return Methods

```
Scanner keyboard =
                new Scanner(System.in);


int num = keyboard.nextInt();
out.println(num);
```

INPUT
1

OUTPUT
1

num
1

return method

Return Methods

```
Scanner keyboard =
                  new Scanner(System.in);

double num = keyboard.nextDouble();
out.println(Math.ceil(num));
```

INPUT
3.45

OUTPUT
4.0

num
3.45

return methods

Return Methods

```
public class ReturnOne
{
   public int twice( int x )   //this is a return method
   {
      return 2*x;
   }
}

//code in the main of another class
ReturnOne demo = new ReturnOne();
out.println(demo.twice(25) );
out.println(demo.twice(17) );
```

OUTPUT

```
50
34
```

Return Method

access	return type	name	params

code

```
public          int          twice( int x )
{
   return 2*x;
}
```

Open returnone.java

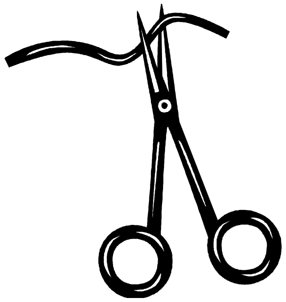
Open returntwo.java

toString

```
class Triangle
{
  private int sideA, sideB, sideC;

  public Triangle(int a, int b, int c)
  {
    sideA=a;
    sideB=b;
    sideC=c;
  }

  public String toString()
  {
    return sideA + " " + sideB + " " + sideC;
  }
}
```

return type

return method



Open tostring.java

Pieces of the OOP Puzzle Part Three

constructors

```
public Triangle()
{
   sideA=0;
   sideB=0;
   sideC=0;
}
```

Default Constructor

Constructors are similar to methods. Constructors set the properties of an object to an initial state.

constructors

```
public Triangle(int a, int b, int c)
{
   sideA=a;
   sideB=b;
   sideC=c;
}
```

Initialization Constructor

Constructors are similar to methods. Constructors set the properties of an object to an initial state.

modifier methods

```
public void setSides(int a, int b, int c)
{
    sideA=a;
    sideB=b;
    sideC=c;
}
```

Modifier methods are methods that change the properties of an object.

accessor methods

```
public int getSideA()
{
  return sideA;
}
```

Accessor methods are methods that retrieve or grant access to the properties of an object, but do not make any changes.

accessor methods

```
public String toString()
{
  return "" + getSideA() + " " + sideB + " " + sideC;
}
```

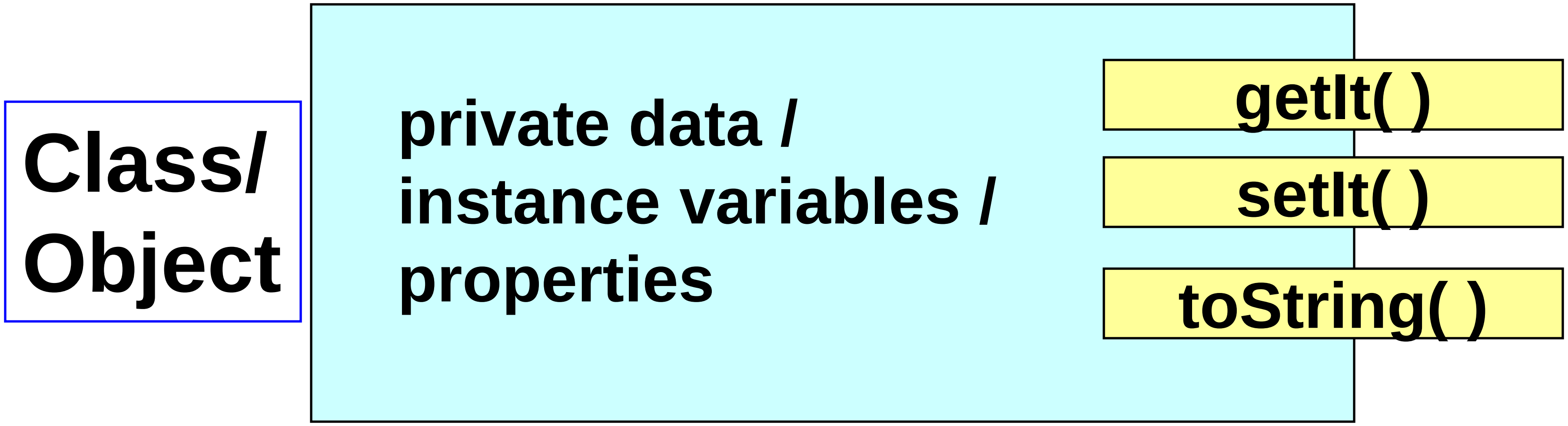
Accessor methods are methods that retrieve or grant access to the properties of an object, but do not make any changes.

encapsulation

All data members should have private access.   The public constructors, accessor methods, and modifier methods should be used to manipulate the data.
All data is tucked away nicely inside the class.

encapsulation

The public methods give you access to an object's private data / properties.



Open
triangle.java
trianglerunner.java

Continue work on the labs