

# COMP 1010- Summer 2015 (A01)

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# Hello!

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# Midterm – quick discussion

# Calendar Exercises:

Exercise: set which day of the week the calendar starts on

Exercise: fix the highlighting to be better centered around the number

Exercise: highlight Sundays and Wednesdays on the calendar

# Example: interactive temperature scale

Globals!

S\_TOP

S\_LEFT

S\_WIDTH

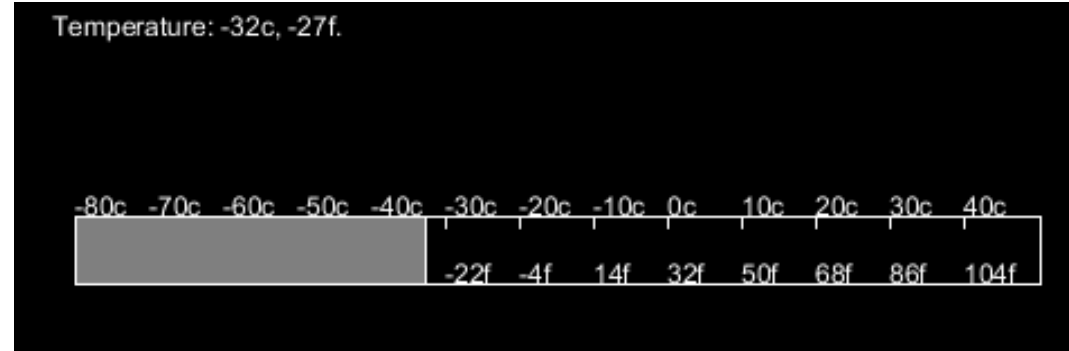
S\_HEIGHT

HOT

COLD

TEMP\_RANGE

Draw outside rectangle



# Example: interactive temperature scale

Tick mark calculations

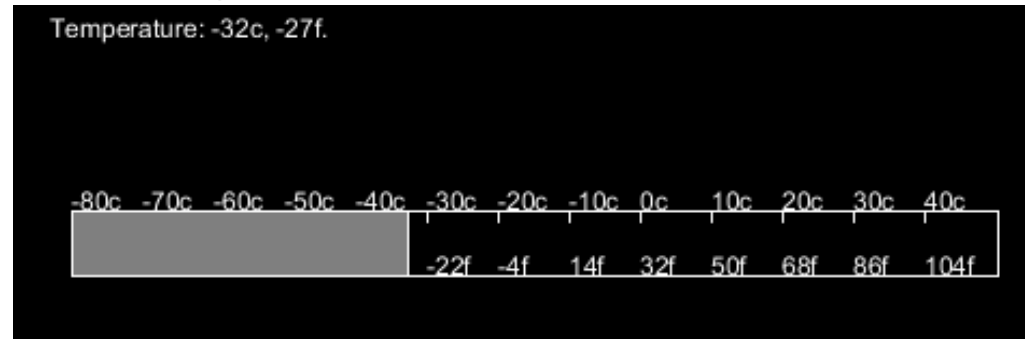
DEG\_PER\_TICK

TICKS

TICK\_SPACING

TICK\_HEIGHT

Draw ticks (for loop!!)



# labels

Calculate and output celcius label at each tick

Calculate Fahrenheit:

$$f = 9/5c + 32$$

Output at each tick at bottom of scale

# Mouse interactive..

- Calculate how far along the scale the mouse is. Take the mouse position and subtract the left end of the scale
- Make sure we're not off either end of the scale!!
- Draw the filling using that width



# Mouse reading

Convert the mouse position to percentage,

Then convert to temperature

Put a string out with the reading

# Let's re-visit the == operator

Compares two values and returns a boolean type

→ Cannot be used to compare Strings  
it may look like it works sometimes, but  
**not** what you think

Tells you if they are the same object

# String is a special case

```
String s1 = "hello.";
```

```
String s2 = "hello.";
```

```
if (s1 == s2) // not what you think!!
```

```
{
```

```
...
```

```
}
```

# boolean stringValue.equals(String)

```
String chantPartA = "hi";
```

```
String chantPartB = "ho";
```

```
boolean areEquals = chantPartA.equals(chantPartB);
```

```
// or, = chantPartB.equals(chantPartA);
```

# char type

holds a single character

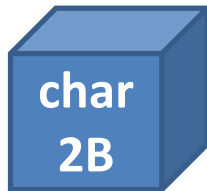
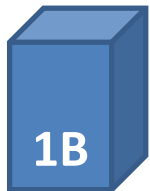
```
char variablename = 'x';
```

you specify a single character by using single quotes: 'x'

**note:** a String is " " and a char is ' '

traditionally, 1 byte

in Processing, its 2 bytes (don't memorize)



# what is a single character??

a letter, e.g., 'f'

a number, e.g., '8'

a symbol, e.g., '+'

a space, ' '

etc...

# How Computers stores characters

in the old days, computers only had a small number of characters they could display:

ASCII standard:

this is a table of characters, and each character has a number.

# standard ASCII table:

ASCII value	Character	Control character	ASCII value	Character	ASCII value	Character	ASCII value	Character
000	(null)	NUL	032	(space)	064	@	096	
001	☺	SOH	033	!	065	A	097	a
002	☹	STX	034	"	066	B	098	b
003	♥	ETX	035	#	067	C	099	c
004	♦	EOT	036	\$	068	D	100	d
005	♣	ENQ	037	%	069	E	101	e
006	♠	ACK	038	&	070	F	102	f
007	(beep)	BEL	039	'	071	G	103	g
008	■	BS	040	(	072	H	104	h
009	(tab)	HT	041	)	073	I	105	i
010	(line feed)	LF	042	*	074	J	106	j
011	(home)	VT	043	+	075	K	107	k
012	(form feed)	FF	044	,	076	L	108	l
013	(carriage return)	CR	045	-	077	M	109	m
014	♪	SO	046	.	078	N	110	n
015	☼	SI	047	/	079	O	111	o
016	▲	DLE	048	0	080	P	112	p
017	▼	DC1	049	1	081	Q	113	q
018	↕	DC2	050	2	082	R	114	r
019	!!	DC3	051	3	083	S	115	s
020	π	DC4	052	4	084	T	116	t
021	§	NAK	053	5	085	U	117	u
022	▬	SYN	054	6	086	V	118	v
023	↕	ETB	055	7	087	W	119	w
024	↑	CAN	056	8	088	X	120	x
025	↓	EM	057	9	089	Y	121	y
026	→	SUB	058	:	090	Z	122	z
027	←	ESC	059	;	091	[	123	{
028	(cursor right)	FS	060	<	092	\	124	
029	(cursor left)	GS	061	=	093	]	125	}
030	(cursor up)	RS	062	>	094	^	126	~
031	(cursor down)	US	063	?	095	_	127	␣



# why do we number the characters?

ASCII value	Character
----------------	-----------

064	@
065	A
066	B
067	C
068	D
069	E
070	F
071	G
072	H
073	I
074	J
075	K
076	L
077	M
078	N
079	O

everything in a computer is stored as numbers.

even your music and photos!!!

some clever people decided on a standard numbering, so that, e.g., the number 65 is A, 78 is N, etc.

# How to check the ascii number of a character?

Force the data into an integer

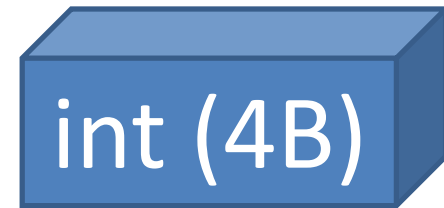
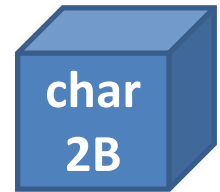
(advanced, gimmicky, don't study)

# Char and casting

Since the character is simply an integer number underneath, you can convert back and forth to an integer.

char -> int is a widening cast because the int has more memory (implicit cast)

int->char is a narrowing cast because the char is less capable: requires an explicit cast



# ASCII is limited!!!

ASCII value	Character	Control character	ASCII value	Character	ASCII value	Character	ASCII value	Character
000	(null)	NUL	032	(space)	064	@	096	
001	☺	SOH	033	!	065	A	097	a
002	☹	STX	034	"	066	B	098	b
003	♥	ETX	035	#	067	C	099	c
004	♦	EOT	036	\$	068	D	100	d
005	♣	ENQ	037	%	069	E	101	e
006	♠	ACK	038	&	070	F	102	f
007	(beep)	BEL	039	'	071	G	103	g
008	▣	BS	040	(	072	H	104	h
009	(tab)	HT	041	)	073	I	105	i
010	(line feed)	LF	042	*	074	J	106	j
011	(home)	VT	043	+	075	K	107	k
012	(form feed)	FF	044	,	076	L	108	l
013	(carriage return)	CR	045	-	077	M	109	m
014	☐	SO	046	.	078	N	110	n

only one language at a time:

language-specific, accented letters, etc.

does not handle complex writing systems!

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remember those garbled websites?

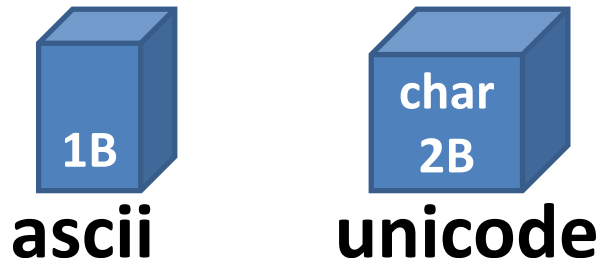
# Unicode:

ONE standard for all languages  
is the reason I can put many languages at once:

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double the memory of ASCII –

**note:** each character takes 2 bytes of memory.





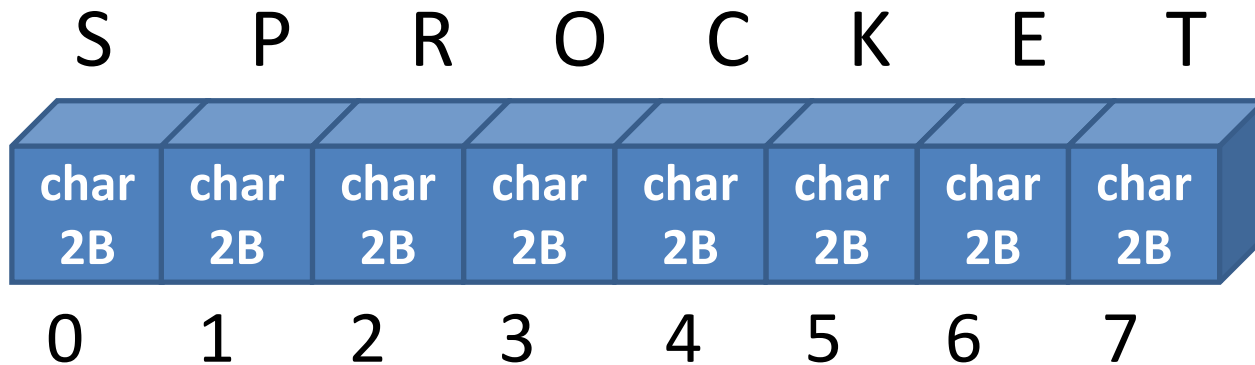
# String indices

each box has a designated number

the 1<sup>st</sup> box is box 0

2<sup>nd</sup> is box 1..... and so forth

**Note: OFF BY ONE ERROR!**



# String methods!!

Your string variable type has several built-in **methods** (commands) that you can use.

```
variableName.method(parameters);
```

```
String dogName;
```

```
dogName = "sprocket";
```

```
// dogName.method(parameters);
```

```
dogName.length(); // takes no parameters
```

```
...
```



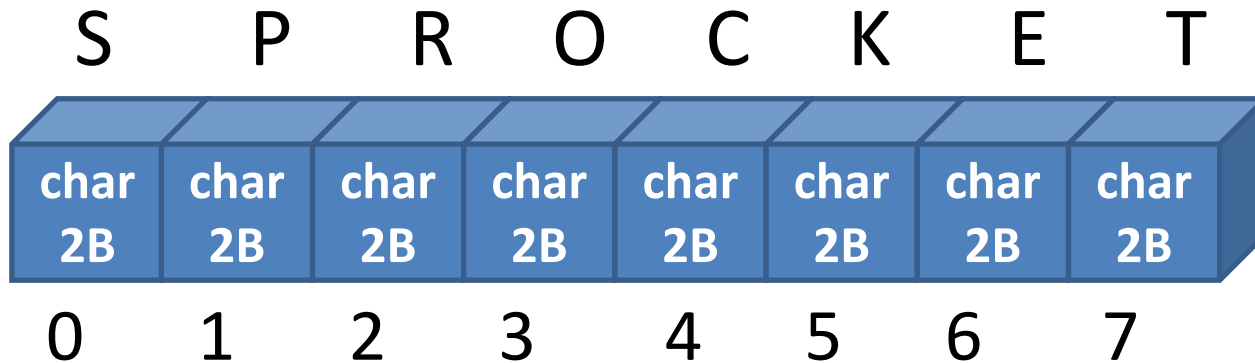
# String Length:

```
int variableName.length()
```

What is the length of this string?

**note:** the index of the last character is  
`string.length() - 1`

**off by one error**



# Get character:

## `char variableName.charAt(int index)`

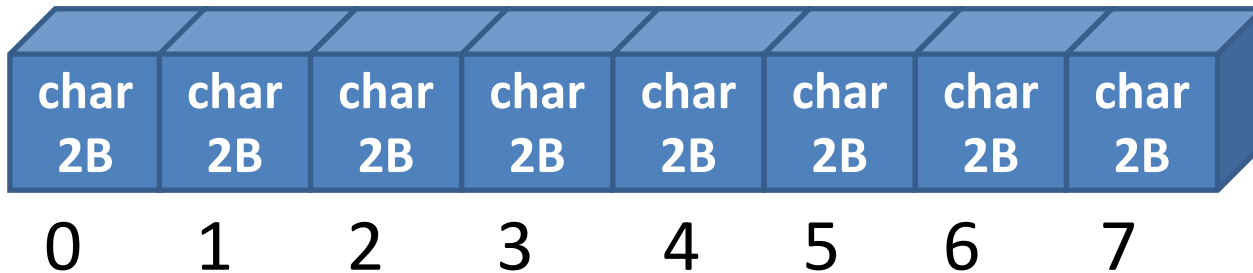
returns the specific single character at the given index (box #).

e.g.,:

```
String dogName = "sprocket";
```

```
char secondLetter = dogName.charAt(1);
```

S P R O C K E T



# Off-by-one string length error

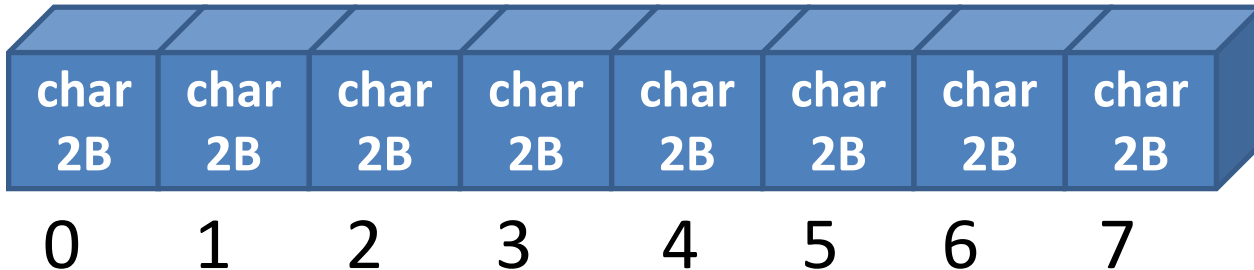
```
String s = "SPROCKET";
```

```
char lastCharacter = s.charAt(s.length());
```

**ERROR**

```
char lastCharacter = s.charAt(s.length()-1);
```

S P R O C K E T



Example: put string out one character  
at a time

Select spacing

Off by one errors!

Increase spacing

Animate spacing

# Palindrome tester

Reverse a string

Compare against original

If equal – palindrome!

# How to reverse a string?

Go through string with a for loop

Get each character

Add to a new string in the opposite order