



THE UNIVERSITY OF
MELBOURNE

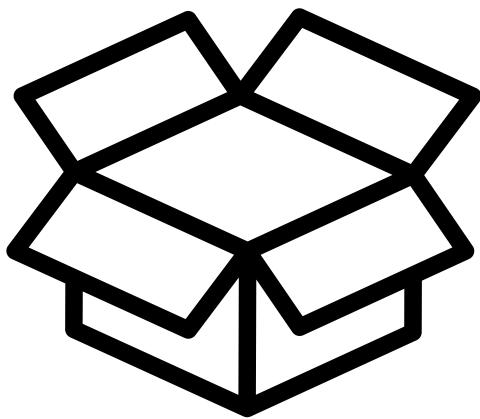
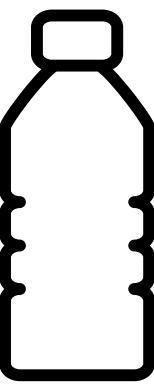
COMP10001 - Sem 2 2024 - Week 3

Foundations of Computing

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Data Types



Identifying Data Types

Type	Example	What does it store?	What can we do with it (functions, operations...)?	How do we convert to it?
string	"Hello"	Text	print, slice, concatenate, ... index, find	str(~)
Integer	numbers, no quotes 123 no decimal	Integers \mathbb{Z}	$+$ $-$ \div \times \parallel $**$	int(~)
Float	3.1415	Real Numbers \mathbb{R}	$+$ $-$ \div \times \parallel $**$	float(~)
Boolean	True False	Truth Values True or False	and or not	bool(~)

Library Database

Name	Late Fees Owed	Whether they are a student
Strings	Float \$12.49	Boolean
	\$3.3333333...	state = Strings
	Int. \$3.563	- -
Number of Books loaned out	User ID	Borrow Date and Time
Integer	Integers	strings
	Strings	integers

Evaluate by Hand

`str(3 + 4) + "cakes"`

$\underbrace{\text{str}(7)}$

`"7" + "cakes"`

`"7cakes"` strings

`float("357" + "." + "23")`

$\underbrace{\text{float}("357\cdot23")}$

`357.23` float

`int(5 / 2)`

$\underbrace{\text{int}(2.5)}$

`2 int`

`int(3.99)`

3

`bool("anything")`

`bool("") = False`

True bool

O
" "
C >
{ }]

Evaluate by Hand, given $a = 1$, $b = 2$, $c = 2.0$

a / a $1/1$ 1.0_{float}	$b + b$ $2+2$ 4_{int}	$b + c$ $2+2.0$ 4.0_{float}	a / b 0.5_{float}
$a // b$ $1//2$ 0_{int}	$a \% b$ $1 \% 2$ remainder 1_{int}	$a + b / c$ $1+2 \times 2.0$ $1+1.0$ 2.0_{float}	$(a + b) / c$ $(1+2)/2.0$ $3/2.0$ 1.5_{float}

Evaluate by Hand

123 + 123

246 int

"123" + "123"

"123123" str

"123" + 123

X Error

3 * 4

12 int

"3" * 4

"3333" string

"3" * "4"

X Error

"hello" * 3
"hellohellohello"

Fun Fact

```
IDLE Shell 3.12.2  
Python 3.12.2 (v3.12.2:6abddd9f6a, Feb  6 2024, 17:02:06) [C  
lang 13.0.0 (clang-1300.0.29.30)] on darwin  
Type "help", "copyright", "credits" or "license()" for more  
information.  
>>> 0.1 + 0.1 + 0.1 + 0.1 + 0.1 + 0.1 + 0.1 + 0.1 + 0.1  
0.9999999999999999  
>>> 10000000000 * 0.0000000001  
0.9999999999999999  
>>> |  

$$0.1 = 2^{-3}$$
  
Ln: 7 Col: 0
```

a	b	a and b
True	True	True
True	False	False
False	True	False
False	False	False

a	b	a or b
True	True	True
True	False	True
False	True	True
False	False	False

a	not a
True	False
False	True

Not
And
Or

Time for the Truth

True or False

True

True and False

False

False and not False or True

False and True or True

False or True

True

False and (not False or True)

(True or True)

False and True

False

Logical
Methods

s = "unimelb"

0	1	2	3	4	5	6
u	n	i	m	e	l	b
-7	-6	-5	-4	-3	-2	-1

Indexing

```
s[0] = "u"
s[3] = "m"
s[-1] = "b"
s[-5] = "i"
```

Slicing

```
s[0:3] = "uni" = s[:3]
s[3:7] = "melb" = s[3:]
s[0:7:2] = "uiedb" = s[::2]
s[6::-1] = "bleminu" = s[::-1]
```

Evaluate by Hand, given $s = \text{"Python"}$

0	1	2	3	4	5
P	y	t	h	o	n
-6	-5	-4	-3	-2	-1

$s[1]$

"y"

$s[-1]$

"n"

$s[1:3] + s[3:5]$

"yt" + "ho"
"ytho"

$s[10]$

X Error

$s[10:]$

" "

$s[::2]$

"pto"

$s[1:3] + s[3:5]$

$s[-4:-2]$

"th"

$s[:: -1]$

"nohtyP"



```
x = input("What path should I take?")
if x=="left":
    print("fire, begone !")
else:
    print("walk")
```



```
x = input("What path should I take?")
if x=="1":
    print("fly, you fools!")
elif x=="2":
    print("ghost, begone!")
elif x=="3":
    print("walk")
elif x=="4":
    print("asteroid!")
else:
    print("wait till sun")
```

If you can dream—and not make dreams your master;

if 10 > var >= 5:

 print("hello")

5, 6, 7, 8, 9 ✓
10, 4, 3, 11 X

if var[0] == "A" and var[-1] == "e":

 "ATE" X
 "Ape"
 "Arcane"
 "Ache"
 "Banana"
 "Appy"
 "House"

if var in ("VIC", "NSW", "ACT"): "VK NSW" X

"SA" ✓
"VIC" ✓
"NSW"
"ACT"
"WA"
"SA"
"AS"
"V"

if var:

 if bold:
 True ✓
 "Anything"
 False X
 0 X
 ... X

happy → variable

"happy" → string

if "happy"; True

happy() ← function

if "": False

Fix the Code

```
eggs == 3  
if eggs = 5:  
    print("spam")
```

else:

```
    print("not spam")
```

~~XXX~~

Assignment = 3

Comparison == 3

eggs=3

if eggs == 5:

print("spam")

else:

print("not spam")

```
# Fix the Code
letter = input("Enter a letter: ")

if letter == 'a' or 'e' or 'i' or 'o' or 'u':
    print("vowel")
else:
    print("consonant")

if letter == "a" or letter == "e" or . . . :
    if letter in ("a", "e", "i", "o", "u"):
        if letter in "aeiou":
```

Paper Programming



Write a program which asks the user for their age and calculates the year in which they were born. There will be two possibilities since you haven't asked for their birthdate, so print both. For example, your program should work similar to this when the user inputs 18:

```
Enter your age: 18
```

```
You were born in either 2006 or 2005
```

```
age = int(input("Enter your age: "))
print('You were born in either', 2024-age, "or", 2023-age)
```

Write a program which asks the user for a temperature in degrees Fahrenheit and prints the corresponding value in Celsius. The conversion formula is below:

$$C = \frac{F - 32}{1.8}$$

This is an example of how the program could work when the user inputs 90:

Enter the temperature in Fahrenheit: 90

90.0 Fahrenheit converts to 32.22222222222222 Celsius

Write a program which asks the user for a word, and prints a shortened version of their word consisting of its first three letters and then every second letter in the rest of the word. For example, when the user inputs the word Honorificabilitudinitatibus, the program might work like this:

```
Enter a word: Honorificabilitudinitatibus  
Honrfcbltdnttbs
```

word[:3] + word[4::2]

Heat Waves

In this question you'll be writing a program that asks the user about the weather and prints snappy responses that depend on what the user has input. Feel free to be creative in the responses and try to come up with at least four (including one for an `else` branch)! Some examples of how your program could behave:

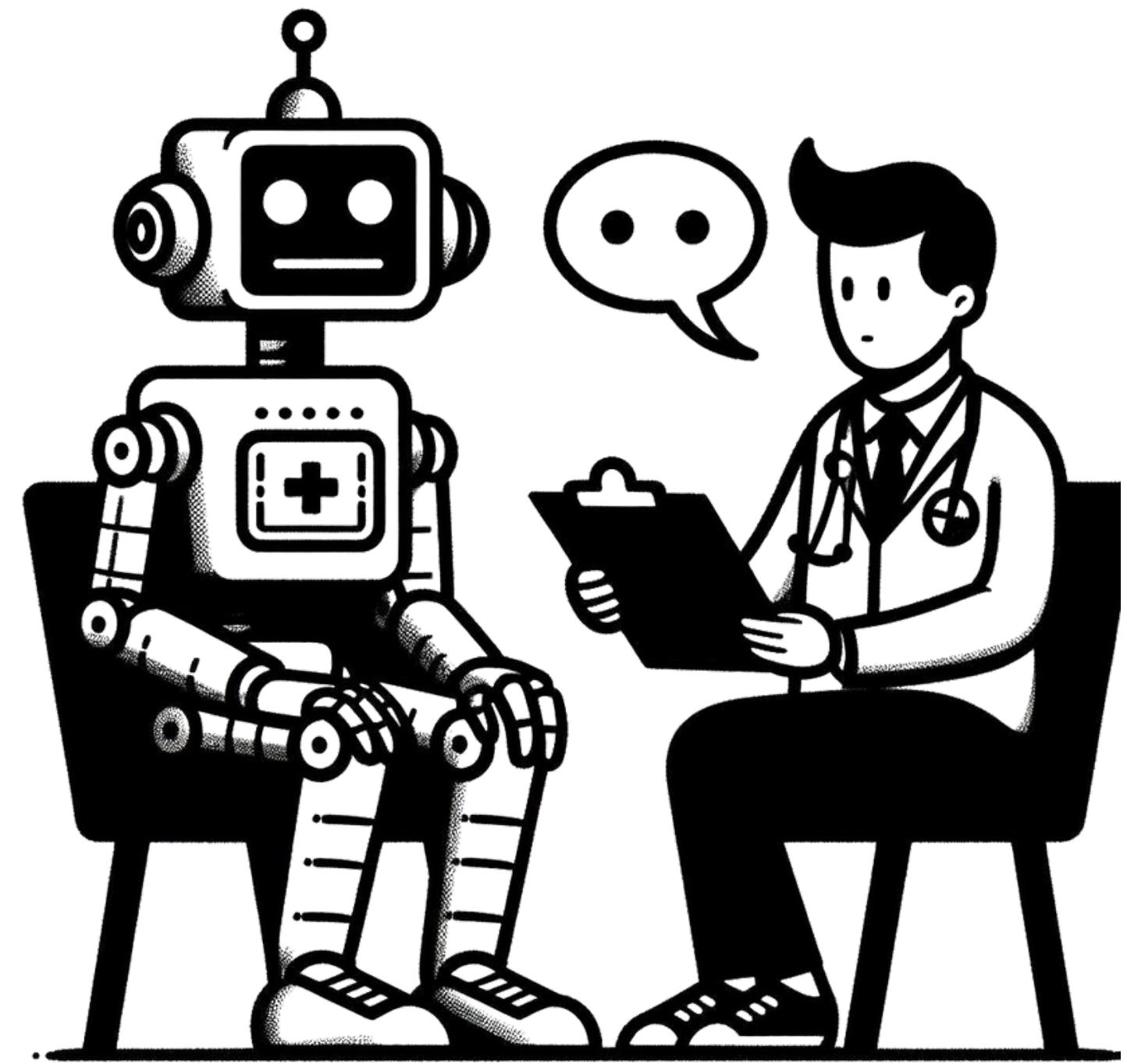
What's the weather like? `rainy`

Raining cats and dogs!

What's the weather like? `typical Melbourne`

Four seasons in one day!

Meet ELIZA



Can you create a basic ELIZA?

Grok Worksheets 0-2 due soon

Good time to start Worksheets 3-5

