



F1.8 Data types and casting

Programming basics · GCSE · OCR J277 2.2.2, AQA 8525 3.2.1, Edexcel
1CP2 6.3.1 · about 15 min

What this lesson is about

Integer, real, Boolean, character and string, and converting between them.

- Five types
- Casting: changing the type
- Why the type matters
- When casting fails

Questions

7 marks in all

1. Which data type best suits whether the robot has bumped into something?

[1 mark]

- ☐ A Boolean
- ☐ B Integer
- ☐ C String
- ☐ D Real

Answer: A. It is either true or false, so a Boolean.

2. Which data type best suits a distance measured to a tenth of a centimetre, such as 41.3?

[1 mark]

- ☐ A Real
- ☐ B Integer
- ☐ C Boolean
- ☐ D Character

Answer: A. It has a fractional part, so a real number (a float in Python).

3. What does this program print?

[1 mark]

```
print(int("20") * 3)
print("20" * 3)
```

Answer:

```
60
202020
```

int turns the text into a number, so the first line multiplies. The second repeats the text.

4. What does this program print?

[1 mark]

```
print(int(7.9))
```

Answer:

```
7
```

int chops off the fractional part. It does not round.

5. What happens with `int("twenty")` ?

[1 mark]

- ☐ A A ValueError: there is no number in the text
- ☐ B It gives 20
- ☐ C It gives 0
- ☐ D It gives the string "twenty"

Answer: A. Casting only works when the text holds a number in the right form. This is a runtime error.

6. What is casting?

[1 mark]

- ☐ A Converting a value from one data type to another
- ☐ B Storing a value in a variable
- ☐ C Printing a value
- ☐ D Rounding a number

Answer: A. `int()`, `float()` and `str()` are casting functions.

7. Which function turns `"2.5"` into the number 2.5?

[1 mark]

Answer: `float`. `float` converts to a real number. `int` would refuse text with a decimal point.

The task: drive what you type

Ask `How far?` , turn the answer into a number, and drive exactly that far forward. The task will answer `35` , so the robot should stop 35 cm up the mat. Your program must work for any distance: do not type 35 into it.

```
# the two lines every program starts with: the commands, then the robot
from bugbot import *
connect()

far = input("How far? ")
forward(50, distance=far)
```

The hint students can ask for: What `input()` gives you is always text, so turn the answer into a number before you drive with it.

A solution

```
from bugbot import *
connect()
far = float(input("How far? "))
forward(50, distance=far)
```

Any program that meets the task's checks is marked correct in the simulator; this is one way, not the only way.