Data Types

Strings

Any string of characters.
EG: “This is a string.” - Strings are written in quotation marks
str() - Used to convert something to a string.
EG: str(25) will turn the integer 25 into the string “25”
Comes in handy when adding integers to sentences.

Integer

Any number from negative infinity to positive infinity that does not have a decimal point.
EG: -5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5 - These are all integers.
int() - Used to convert something to an integer.
EG: int(“25”) will turn the string “25” into the integer 25.
Comes in handy when taking user inputs as they are saved as strings.

Floating Point Numbers

Any number from negative infinity to positive infinity that has a decimal point.
EG: -1.5, 12.0, 34.6757 - These are all floating point numbers.
float() - Used to convert other types into a floating point number.
EG: float(25) will turn the integer 25 into the floating point 25.0
Comes in handy when you need to compare an integer to a floating point number.

Complex Numbers

Complex numbers have a “real” part and an “imaginary” part, shown as the letter j.
EG: 5j, 10j, 5 + 5j, 10 + 0j - These are complex numbers. (Algebra uses complex numbers)
complex() - Used to convert other types into a complex number.
complex(25) - Used to convert the integer 25 to the complex number 25 + 0j.
Comes in handy when doing algebra maths with user inputs.

Operators

Arithmetic Operators (Maths)

Name	Operator	Example	Notes
Addition	**+**	5 + 5 = 10	Simple addition (Plus)
Subtraction	**-**	5 - 2 = 3	Simple subtraction (Minus)
Multiplication	*****	5 * 10 = 50	Simple multiplication (Times)
Division	**/**	6 / 3 = 2	Simple division (divide)
Exponentiation	****	5 ** 3 = 125	Same as 5*5*5

Comparison Operators (Comparing two sides, Boolean output)

Name	Operator	Example
Equal	**==**	1 == 1 is True | 1 == 2 is False
Not Equal	**!=**	1 != 1 is False | 1 != 2 is True
Greater Than	**>**	5 > 1 is True | 5 > 5 is False
Lesser Than	**<**	5 < 1 is False | 1 < 5 is True
Greater Than or Equal to	**>=**	10 >= 10 is True | 5 >= 10 is False
Lesser Than or Equal to	**<=**	5 <= 10 is True | 11 <= 10 is False

Logical Operators (Comparing more than one boolean, same as Scratch)

Name	Operator	Example	Notes
And	**and**	10 > 5 and 5 > 2 is True 6 < 5 and 5 > 2 is False	Both sides must be true for the output to be true.
Or	**or**	2 > 5 or 5 == 2 is False 6 < 5 or 5 > 2 is True	Only 1 side must be true for the output to be true.
Not	**not**	not(10 > 5 and 5 > 2) is False not(6 < 5 and 5 > 2) is True	Returns the opposite of whatever the result was.

GUI - Tkinter

Widgets: Tk(), Label(), Text(), Entry(), Button()

Reference Key:
A = The window it must display on.
B = The text it must display.
C = Co-ordinates for placing text. Eg: 0.0
D = Function's name without brackets - runs when button is clicked.
X = Variable name

tkinter.Tk() - Used to create a window.

tkinter.Label(A, text = B) - Used to display text.

tkinter.Text(A) - Creates a Text box.
X.insert("C", B) - Inserts text into the Text box widget.

tkinter.Entry(A) - Creates an Entry widget for inputting data.
X.get() - Gets the value entered in the Entry widget.
X.delete(0, "end") - Removes text from Entry widget.

tkinter.Button(A, text = B, command = D)

X.grid(row = , column = , rowspan = , columnspan =)
row = Which row it must appear on, starts at 0.
column = Which column it must appear on, starts at 0.
rowspan = Number of rows it must take up.
columnspan = Number of columns it must take up.
(only use the properties you need)

Additional Info: Use if-statements to compare the user's entry to the actual information. Remember to use == instead of = to compare. You do not need a way for the user to change the username and password, you can set it in your code.