

Homework Assignment

Week 3: Variables and Data Types

Total Points: 100 — Due: Next Class



Name: _____

Date: _____

Important Instructions

- Work on your own, but you may ask family members for hints only if stuck
- Write your code in Python (*using Thonny or online IDE*)
- For setting up your code files, kindly see `instructions.pdf`
- For written answers, use the spaces provided on this sheet
- Show your work for full credit!

1 Part 1: Data Type Detective (15 points)

Time estimate: 20 minutes

1.1 Exercise 1.1: Identify the Data Type (8 points)

For each value below, identify its data type (`int`, `float`, `string`, or `bool`) and explain how you know:

Value	Data Type	How I Know
42		
"42"		
3.14		
True		
'Hello'		
100.0		
"True"		
-15		

2 Part 2: Variable Assignment Practice (15 points)

Time estimate: 20 minutes

2.1 Exercise 2.1: Student Information Storage (8 points)

Instructions: Open [week3_ex2_1.py](#) in Thonny. Replace the blanks, complete the code to store information about yourself using appropriate variable names and data types:

```

1 # Store your personal information in variables
2 ----- = "Your Name"           # Your full name
3 ----- = -----             # Your age (what type?)
4 ----- = -----             # Your grade (7)
5 ----- = -----             # Your height in cm (e.g., 152.5)
6 ----- = -----             # Do you like Python? (True/False)
7 favorite_subject = -----    # Your favorite subject
8
9 # Display all information
10 print("Student Profile:")
11 print("Name:", -----)
12 print("Age:", -----)
13 print("Grade:", -----)
14 print("Height:", -----, "cm")
15 print("Likes Python:", -----)
16 print("Favorite Subject:", -----)

```

Make sure to save this code in the `week3_ex2_1.py` before moving to the next exercise.

2.2 Exercise 2.2: Cricket Score Calculator (7 points)

Open [week3_ex2_2.py](#) in Thonny. Write code to calculate and store match statistics for Pakistan's cricket team. Fill in the blanks with appropriate values and calculations:

```

1 # Cricket match statistics
2 team_name = "Pakistan"
3 total_runs = -----          # Store 287 runs
4 wickets_lost = -----        # Store 6 wickets
5 overs_played = 47.3           # Notice the decimal!
6 run_rate = -----            # Calculate: runs / overs_played
7
8 # Player statistics
9 babar_runs = -----          # Store 89 runs
10 rizwan_runs = -----         # Store 76 runs
11 total_boundaries = 28
12 is_winning = -----         # Store True or False
13
14 # Display match summary
15 print("=== Match Summary ===")
16 print("Team:", -----)
17 print("Score:", -----, "for", -----)
18 print("Run Rate:", -----)
19 print("Babar + Rizwan =", ----- + -----, "runs")

```

Make sure to save your progress in the `week3_ex2_2.py` file.

3 Part 3: Memory Diagram Tracing (20 points)

Time estimate: 25 minutes

3.1 Exercise 3.1: Trace Variable Changes (10 points)

Trace through this code step by step. Fill in the memory diagram showing what's stored after each line:

```

1 x = 10           # Line 1
2 y = 20           # Line 2
3 z = x + y        # Line 3
4 x = 25           # Line 4
5 y = x            # Line 5
6 z = x + y        # Line 6
7 print(x, y, z)   # Line 7
    
```

Line	x	y	z
Line 1			
Line 2			
Line 3			
Line 4			
Line 5			
Line 6			
Line 7			

Instructions for filling the memory diagram:

- Write “not created” if the variable hasn’t been created yet
- Write the value stored in the variable after each line executes
- When a variable’s value changes, cross out the old value and write the new one
- Remember: Line 7 just prints, so values stay the same as Line 6

What will Line 7 print? _____

3.2 Exercise 3.2: Shopping Cart Variables (10 points)

Trace this shopping program without running it and draw the final memory diagram. You are free to draw the diagram as boxes (*like in previous week*) or use a table like above:

```

1 # Shopping at local store
2 item1_name = "Samosas"
3 item1_price = 20.0
4 item1_quantity = 6
5
6 item2_name = "Mango Juice"
7 item2_price = 45.50
8 item2_quantity = 2
9
10 # Calculate totals
11 samosa_total = item1_price * item1_quantity
12 juice_total = item2_price * item2_quantity
13 cart_total = samosa_total + juice_total
14
15 # Apply discount
16 discount = 0.1 # 10% discount
17 final_price = cart_total - (cart_total * discount)
18
19 print("Total before discount:", cart_total)
20 print("Final price:", final_price)
    
```

Save your trace work on a separate piece of clean paper, showing values at each step.

4 Part 4: Type Behavior Matching (10 points)

Time estimate: 15 minutes

4.1 Exercise 4.1: Operation Results (10 points)

Match each operation with its result. Draw lines to connect:

Operation	Result
5 + 3	"HelloWorld"
"5" + "3"	53
5.0 + 3.0	8
10 / 2	"53"
5 > 3	5.0
"Hi" * 3	True
"Hello" + "World"	"HiHiHi"
"Hello" + " " + "World"	8.0
	"Hello World"
	"five"
	"5 + 3"

5 Part 5: Debug Detective (15 points)

Time estimate: 20 minutes

Each code snippet has errors related to variables and data types. Find and fix ALL errors:

5.1 Snippet 1: Age Calculator (5 points)

Open up [week3_ex5.1.py](#). This code has 3 issues - fix them all!

```

1 name = Ahmad
2 age = "15"
3 next_year = Age + 1
4 print(name, "will be", next_year, "years old next year")

```

Save your corrected code in week3_ex5.1.py

5.2 Snippet 2: Price Calculator (5 points)

Open [week3_ex5.2.py](#). This code has 4 errors - fix them all!

```

1 price = 50
2 quantity = "3"
3 total = price × quantity
4 discount = 10%
5 final_price = total - discount
6 print("Final price: Rs.", final_price)

```

Save your corrected code in week3_ex5.2.py

5.3 Snippet 3: Temperature Converter (5 points)

Open [week3_ex5.3.py](#). This code has 6 issues - fix them all!

```

1 celsius = 30.5
2 fahrenheit = celsius × 9 ÷ 5 + "32"
3 kelvin = celsius + 273.15
4 print(celsius + " Celsius = " + fahrenheit + " Fahrenheit")
5 print("Is it hot?", is_hot)

```

Save your progress in `week3_ex5.3.py`

6 Part 6: Creative Variable Challenge (20 points)

Time estimate: 30 minutes

Create a simple report card system. Your program should:

- Store student name and class
- Store marks for 5 subjects (as numbers)
- Calculate total marks and percentage
- Store whether student passed (as True or False)
- Display a formatted report card

Open [week3_6.py](#) and fill in the blanks to complete the code:

```

1 # Student Report Card System
2 print("=== Student Report Card ===")
3
4 # Student information
5 student_name = _____
6 student_class = _____
7
8 # Subject marks (out of 100)
9 urdu_marks = _____
10 english_marks = _____
11 math_marks = _____
12 science_marks = _____
13 islamiat_marks = _____
14
15 # Calculations
16 total_marks = _____
17 percentage = _____
18 passed = percentage >= 40 # True if passed, False if failed
19
20 # Display report card
21 print("\n----- REPORT CARD -----")
22 print("Name:", _____)
23 print("Class:", _____)
24 print()
25 print("Subject Marks:")
26 print("Urdu:", _____)
27 print("English:", _____)
28 print("Mathematics:", _____)
29 print("Science:", _____)
30 print("Islamiat:", _____)
31 print()
32 print("Total Marks:", _____, "/ 500")

```

```

33 print("Percentage:", _____, "%")
34 print("Passed:", _____)
35 print("-" * 22)
    
```

Save your work in `week3.6.py` before moving on.

7 Part 7: Reflection Questions (5 points)

Time estimate: 10 minutes

Answer these questions in complete sentences:

1. Which data type was most confusing to work with and why? How will you remember when to use it?

2. Explain in your own words: What happens to the old value when you assign a new value to a variable?

3. Why do you think Python has different data types instead of treating everything the same?

8 Bonus Section: Extra Challenges (Optional - 10 extra points)

Only attempt if you've finished everything else!. Please note that this section has some concepts that you haven't learned yet (such as type conversion), so it is optional.

8.1 Challenge 1: Type Detective (5 points)

Without running the code, predict what data type each variable will have:

```

1 a = 5 + 5           # Type: _____
2
3 b = 5 + 5.0        # Type: _____
4
5 c = "5" + "5"     # Type: _____
6
7 d = int("5") + 5   # Type: _____
8
9 e = True + True    # Type: _____
10
11 f = str(5) + str(5) # Type: _____
    
```

8.2 Challenge 2: Variable Swap Puzzle (5 points)

Open up `week3.8.2.py`. Figure out how to swap the values of two variables WITHOUT using a third variable:

```

1 # Start with:
2 x = 10
3 y = 20
4
5 #-----
6 # Your code to swap x and y:
7
8
9 #-----
10 # After your code, x should be 20 and y should be 10

```

Submission Checklist

Before submitting, make sure you have:

- Completed all required sections (Parts 1-7)
- Saved each code exercise in its own file
- Tested each code file individually to ensure it runs without errors
- Written your name at the top of this paper
- Answered all reflection questions
- Attempted bonus section (optional)
- Compressed your code files into a single ZIP file named `week3_hw.zip`

Time Tracking:

How long did this homework take you? _____ hours

Parent/Guardian Signature: _____

(Confirming student completed work independently)

Excellent work understanding how Python stores information!

Next week: Input/Output and Type Conversion