Week 2 Asynchronous Materials Guide

Variables and Data Types

Homework Topics Overview

This week's homework covers:

- Creating variables with different data types (Part 1)
- Variable naming rules (Part 2)
- Data type exploration with type() (Part 3)
- Type conversion: int(), float(), str() (Part 4)
- User input with input() function (Part 5)
- Basic arithmetic operations (Part 6)
- Debugging common errors (Part 7)

Required Materials

Variables & Data Types

LearnPython.org - Variables and Types

https://www.learnpython.org/en/Variables_and_Types

- Variables store data (strings, numbers, booleans)
- Complete interactive tutorial and exercises

W3Schools - Python Variables

https://www.w3schools.com/python/python_variables.asp

- Variable creation and basic naming rules
- Using type() function to check data types

Type Conversion

W3Schools - Python Casting

https://www.w3schools.com/python/python_casting.asp

- Use int(), float(), str() to convert between types
- Always convert strings to numbers before math

Programiz - Type Conversion

https://www.programiz.com/python-programming/type-conversion-and-casting

- Python requires explicit conversion (no automatic string-to-number)

User Input

W3Schools - Python User Input

https://www.w3schools.com/python/python_user_input.asp

- input() always returns strings, even for numbers
- Combine input() with int()/float() to get numeric input

Naming Conventions & Style

Real Python - PEP 8 Guide

https://realpython.com/python-pep8/

- Use snake_case for variables (my_variable not myVariable)
- Avoid 'l', 'O', 'I' as single-character names

Basic Debugging

15 Common Python Errors - Better Stack

https://betterstack.com/community/guides/scaling-python/python-errors/

- Focus on the first 8 error types (read more if curious)
- Understanding SyntaxError, NameError, TypeError basics

- How to read error messages and find the problem line

Quick Reference

Variable Basics

```
# Creating variables
hero_name = "Spider-Man"        # string
power_level = 8.5               # float
years_active = 10               # integer
from_outer_space = True         # boolean

# Check data type
print(type(hero_name))          # <class 'str'>
print(type(power_level))        # <class 'float'>
```

Variable Naming Rules

```
# GOOD names
my_variable = 5
user_age = 25
hero_name = "Batman"

# BAD names (will cause errors)
2nd_variable = 5        # Can't start with number
my-variable = 5         # No dashes allowed
my variable = 5         # No spaces allowed
```

Type Conversion

```
# String to number
age_text = "25"
age_number = int(age_text)      # Convert to integer
price_text = "19.99"
price_number = float(price_text) # Convert to float

# Number to string
score = 100
score_text = str(score)         # Convert to string
```

```
# For math operations, convert first!
user_input = input("Enter a number: ")  # Always a string
number = int(user_input)                # Convert for math
result = number + 10
```

User Input

```
# Getting text input
name = input("What's your name? ")

# Getting number input (convert!)
age = int(input("Enter your age: "))
height = float(input("Enter height: "))

# Using the input
print("Hello", name)
print("Next year you'll be", age + 1)
```

Basic Arithmetic

```
# Math with variables
x = 10
y = 3

addition = x + y        # 13
subtraction = x - y     # 7
multiplication = x * y  # 30
division = x / y        # 3.333...
```

Common Error Types

- **SyntaxError:** Missing quotes, colons, parentheses
- **NameError:** Typo in variable name or undefined variable
- **TypeError:** Trying to add string + number without converting
- **ValueError:** Can't convert invalid string to number