

Answer the following questions in complete sentences:

1. What are the phases of the waterfall model in software development? Briefly describe each phase.

The phases are: customer Request: what the customer wants then, analysis: figure out how to get it done, design: design the app/feature, implementation: build the software based off the design, integration: push the software out to the market, and maintenance: maintain the software, doing updates and checks whenever necessary.

2. What are the differences between integers and floating-point numbers in Python? Integers are whole numbers like 3 4 and 5. Floating points are decimals like 4.23 and 5.83.

3. Explain the role of escape sequences in strings. Provide two examples.

It mainly improves readability. If a code is organized with escape sequences and comments, this allows for developers to really work efficiently.

4. Describe the difference between `//` and `/` in Python.

`//` expresses quotient which is useful for have no remainder while `/` is just division which can have a decimal.

5. What are symbolic constants, and why are they useful? Provide an example.

It's a variable that remains the same and has name that remains unchanged. It's useful for referencing something and using it will have no mistakes since it's knows what your referencing. An example: if you name a variable `x = 21` and rename `x` to `Freddy`, whenever you reference that variable, it will have no mistake on what your want or mean.

6. How does Python handle type conversion when combining integers and floating-point numbers in arithmetic expressions?

It handles it by mixed mode arithmetic. It does it by type conversion function which converts the function into the data type.

7. What is the purpose of program comments and docstrings? Provide an example of each.

The purpose of comments is to help ensure that workflow is faster by explaining the notes of a particular code/script. For example: `#this part of the code is for the implementation of the software that allows the user to see the results of their inputs.`

A docstring is establishing the name of the code, the name of the coder, the updated date of the modifications of the script, and the purpose. This ensures understandability between coders from various places around the world. Example:

```
''' #Name: Pancake App
    #Purpose: Allows to make pancakes on the app.
    #Coder: Jaymoney32
    #Date Modified: March 12th 1900
```

Part 2: Coding Exercises

Write Python code to solve the following problems. Include comments to explain your code.

1. String Manipulation

- Write a Python program that prompts the user for their first and last name.
- Store their input in variables and print a greeting that includes their full name.
- Use string concatenation to format the output.

Example:

Enter your first name: John

Enter your last name: Doe

Output: Hello, John Doe! Welcome to Python programming.

2. Arithmetic Operations

- Write a program that asks the user for two numbers.
- Perform and display the results of the following operations: addition, subtraction, multiplication, integer division, and floating-point division.

3. Using the `math` Module

- Import the `math` module.
- Write a program that calculates and prints:
 - The square root of a number entered by the user.
 - The result of raising a number to a power (user enters the base and exponent).
 - The value of π rounded to 5 decimal places.

4. Variable Reassignment and Type Conversion

- Assign an integer value to a variable.

- Reassign the same variable with a floating-point number.
- Convert a string containing a number into an integer and perform arithmetic with it.
- Print all values before and after type conversion.

Part 3: Discussion Questions

Write a short response (3-5 sentences) for each of the following:

1. Discuss the advantages and disadvantages of the waterfall model compared to incremental and iterative software development.

Waterfall Model:

It allows you to quickly produce the software to the customer/market. This allows for quicker development and improve which in turns causes the producer to make more money. Disadvantage is mainly it takes a quick moment to development, it doesn't have much time for testing.

Incremental

This is good for customer input and is more flexible than waterfall method. Though since it's flexible and semi fast, it does have higher initial costs.

iterative software development:

This is good for prototyping software which is useful for implementation. While its major downside, However it is very complex for something to manage.

2. Compare the way Python handles variables, data types, and arithmetic expressions to another programming language you've used before (e.g., Java, C++, JavaScript, etc.). What are some similarities and differences

The similarities are the concepts of the coding like strings, ints, and floats. The difference mainly is the way its written. So for example in powershell a string is an example of something like this: \$dollar. While in python the same string is 'dollar' or str(dollar) or dollar = x. This is a simple way to put this. Also the difference in what is it used for. Python can used for game development meanwhile Powershell isn't made for that. Just purely automation.

3. Reflect on your experience working with Python so far. What has been the easiest and most challenging aspect?

The easiest part is the variables. The more difficult side of things are loops and selection statements.

Submission Guidelines

- Your assignment should be well-organized and properly formatted.
- Include all written responses and Python code in a .py file
- Make sure to test your code before submitting.