Q1. Create one variable containing following types of data:

```python
CopyEdit
my_data = {
    "string": "Hello, Python",
    "list": [1, 2, 3],
    "float": 3.14,
    "tuple": (4, 5, 6)
}
```

Q2. Given are some variables. Identify their data types:

```python
CopyEdit
var1 = ' '                      # string
var2 = '[ DS , ML , Python]'    # string (note the quotes around the entire content)
var3 = ['DS', 'ML', 'Python']   # list
var4 = 1.                       # float
```

Q3. Explain the use of operators with examples:

```python
CopyEdit
# Division (/)
print(10 / 3)      # Output: 3.333... (returns float)

# Modulus (%)
print(10 % 3)      # Output: 1 (remainder after division)

# Floor Division (//)
print(10 // 3)     # Output: 3 (returns integer part only)

# Exponent (**)
print(2 ** 3)      # Output: 8 (2 raised to the power of 3)
```

Q4. Create a list of length 10 with multiple data types and print element and type:

```python
CopyEdit
mixed_list = [12, "hello", 3.14, True, [1, 2], (3, 4), None, {'a': 1}, 9+2j, False]
```

```
for element in mixed_list:
    print(f"Element: {element}, Type: {type(element)}")
```

Q5. Using a while loop, verify if number A is divisible by B and how many times:

```python
CopyEdit
A = 20
B = 4
count = 0

if B == 0:
    print("Division by zero is not allowed.")
else:
    temp = A
    while temp % B == 0:
        count += 1
        temp = temp // B
    if count > 0:
        print(f"{A} is divisible by {B}, {count} time(s).")
    else:
        print(f"{A} is not divisible by {B}.")
```

Q6. List of 25 integers – Check divisibility by 3:

```python
CopyEdit
numbers = list(range(1, 26))  # Generates numbers from 1 to 25

for num in numbers:
    if num % 3 == 0:
        print(f"{num} is divisible by 3")
    else:
        print(f"{num} is NOT divisible by 3")
```

Q7. Mutable vs Immutable Data Types:

- **Mutable**: Can be changed after creation.
  - Example: List

```python
CopyEdit
lst = [1, 2, 3]
lst[0] = 100  # Modifies the list
print(lst)   # Output: [100, 2, 3]
```

- **Immutable**: Cannot be changed after creation.
  - Example: String

```python
CopyEdit
s = "hello"
# s[0] = "H"  # This will raise an error
s = "Hello"   # This creates a new string object
print(s)
```