Complete Python Basics Guide

1. Variables & Data Types

Python uses dynamic typing. Basic types include:

```
# Integer
age = 25
# Float
price = 9.99
# String
name = "Alice"
# Boolean
is_valid = True
# Type checking
print(type(age))  # Output: <class 'int'>
```

2. Operators

```
# Arithmetic
print(10 + 3)   # Addition
print(2 ** 4)   # Exponentiation

# Comparison
print(5 > 3)    # True
print("a" == "A")  # False

# Logical
has_license = True
has_car = False
print(has_license and has_car)  # False
```

3. Control Flow

```
# If-elif-else
score = 85
if score >= 90:
    grade = 'A'
elif score >= 80:
    grade = 'B'
else:
    grade = 'C'

# Ternary operator
result = "Pass" if score >= 60 else "Fail"
```

4. Loops

```
# For loop
for i in range(3):
    print(f"Number {i}")

# While loop
count = 3
```

```
while count > 0:
    print(count)
    count -= 1

# Loop control
for num in range(10):
    if num == 5:
        break
    print(num)
```

5. Functions

```
# Function definition
def calculate_area(width, height):
    """Calculate rectangle area"""
    return width * height

# Function call
print(calculate_area(5, 4))  # 20

# Default parameters
def greet(name="Guest"):
    print(f"Hello, {name}!")
```

6. Data Structures

Lists:

```
fruits = ["apple", "banana"]
fruits.append("cherry")
print(fruits[1])  # banana
```

Dictionaries:

```
person = {
    "name": "John",
    "age": 30,
    "city": "New York"
}
print(person.get("age"))  # 30
```

7. File Handling

```
# Writing to file
with open("data.txt", "w") as file:
    file.write("Hello World")

# Reading from file
with open("data.txt", "r") as file:
    content = file.read()
print(content)
```

8. Object-Oriented Programming

```
class Dog:
    def __init__(self, name):
        self.name = name
```

```
    def bark(self):
        print(f"{self.name} says woof!")

buddy = Dog("Buddy")
buddy.bark()
```

9. Error Handling

```
try:
    print(10 / 0)
except ZeroDivisionError:
    print("Cannot divide by zero!")
finally:
    print("Cleanup done")
```

10. Advanced Features

List Comprehensions:

```
squares = [x**2 for x in range(5)]
evens = [x for x in range(10) if x % 2 == 0]
```

Lambda Functions:

```
square = lambda x: x ** 2
print(square(5))  # 25
```

End of Python Basics Guide. Created with FPDF.