Chapter 3: Control Flow and Loops

Lesson 1: Conditional Statements

Conditional statements in Python are used to make decisions based on certain conditions. They allow the program to execute specific blocks of code based on whether a condition is `True` or `False`. The most common conditional statements in Python are `if`, `elif`, and `else`.

1. `if` Statement

The `if` statement is used to test a condition. If the condition evaluates to `True`, the block of code within the `if` statement will execute.

Example:

```
age = 18
if age >= 18:
    print("You are an adult.")
```

2. `elif` Statement

The `elif` (short for "else if") statement allows you to test multiple conditions. It is used when you want to check for additional conditions if the initial `if` condition fails.

Example:

```
age = 16
if age >= 18:
    print("You are an adult.")
elif age >= 13:
    print("You are a teenager.")
```

3. `else` Statement

The `else` statement is used to execute a block of code if all the preceding conditions in the `if` and `elif` statements evaluate to `False`.

Example:

```
age = 10
if age >= 18:
    print("You are an adult.")
```

```
elif age >= 13:
    print("You are a teenager.")
else:
    print("You are a child.")
```

4. Nested Conditional Statements

You can use conditional statements inside another conditional statement, which is known as nested conditions.

Example:

```
age = 20
is_student = True

if age >= 18:
    if is_student:
        print("You are an adult student.")
    else:
        print("You are an adult, not a student.")
```

5. Logical Operators in Conditional Statements

You can combine conditions using logical operators such as `and`, `or`, and `not`.

Examples:

- `and`: Both conditions must be `True`.

  ```
  age = 20
  has_license = True
  if age >= 18 and has_license:
      print("You can drive.")
  ```

- `or`: At least one condition must be `True`.

  ```
  age = 16
  has_ticket = True
  if age >= 18 or has_ticket:
      print("You can enter the concert.")
  ```

- `not`: Reverses the condition's truth value.

  ```
  ```

```
is_raining = False
if not is_raining:
    print("You can go outside!")
```

Practice Exercises

1. Even or Odd

Write a Python program that checks if a given number is even or odd.

Example:

```
# Sample input: 4
# Output: "4 is even"
```

2. Check if Number is Positive, Negative, or Zero

Create a program that accepts a number from the user and prints whether it is positive, negative, or zero.

Example:

```
# Sample input: -5
# Output: "The number is negative."
```

3. Voting Eligibility

Write a Python program that checks if a person is eligible to vote. The program should check if the person is at least 18 years old and a citizen of the country.

Example:

```
# Sample input: age = 20, is_citizen = True
# Output: "You are eligible to vote."
```

4. Grading System

Write a program that assigns a grade based on a student's score. The grading system is as follows:

- 90 and above: "A"
- 80-89: "B"
- 70-79: "C"
- 60-69: "D"
- Below 60: "F"

Example:

```
# Sample input: score = 85
# Output: "Grade: B"
```

5. Nested Conditionals for Age and Gender

Write a program that determines if someone is eligible for a special discount based on their age and gender. The criteria are as follows:

- Women under 25 get a discount.
- Men above 65 get a discount.

Example:

```
# Sample input: age = 23, gender = 'female'
# Output: "Eligible for discount."
```

6. Multiple Conditions for Admission

Write a program that checks if a person qualifies for admission to a school based on the following conditions:

- The person must be at least 18 years old.
- The person must have a high school diploma.
- The person must pass the admission test.

Example:

```
# Sample input: age = 19, has_diploma = True, passed_test = True
# Output: "You are qualified for admission."
```