CompSci 101 Lab 4

Boolean expressions
if statements
if .. else statements
if .. elif .. else statements
while loops

Boolean expressions

- A boolean expression is an expression that evaluates to True or False

Examples:

amount >= 0

day == "Friday"

bank_balance < 0

Relational Operators

- Boolean expressions are usually formed using relational operators.

Examples:

==	is equal to
!=	is not equal to
>	is greater than
>=	is greater than or equal to
<	is less than
<=	is less than or equal to

Boolean variables

- A boolean variable is a variable that contains either True or False

Examples of assigning values to boolean variables:

game_over = True

has_finished = False

is_a_child = age < 16

has_passed = mark >= 50

Boolean Operators

- not
- and
- or

- The **not** operator returns True if its operand is a False expression and returns False if its operand is True.
  - Example: **not** age > 5

- The **and** operator returns True if both operands return True.
  - Example: age > 5 **and** age < 90

- The **or** operator returns True if at least one of the operands returns True.
  - Example: age < 5 **or** age > 90

If statements

Format of an if statement:

if *boolean expression*:

    statement block

Example:

If bank_balance < 0:

    print("Your account is overdrawn")

if .. else statements

Format of an if .. else statement:

if *boolean expression*:
    statement block
else:
    statement block

Example:
If mark >= 50:
    print ("You have passed the test")
else:
    print ("You have failed the test")

if .. elif .. else statements

Format of an if .. elif .. else statement:

if *boolean expression*:

    statement block

elif boolean expression:

    statement block

else:

    statement block

if .. elif .. else statements

Example:

```python
def print_greeting(hour):
    print("Good", end = " ")
    if hour < 12:
        print("Morning")
    elif hour == 12:
        print("Noon")
    elif hour < 17:
        print("Afternoon")
    else:
        print("Evening")
    print("Have a nice day")
```

while loop

Format of a while loop:

while *boolean expression*:
    statement block

Example:

```
number = 1
while number <= 3:
    number_squared = number ** 2
    print(number_squared)
    number = number + 1
```

Leap Year Example

```python
def main():
    year = get_year_from_user()
    while year != 0:
        display_whether_a_leap_year(year)
        year = get_year_from_user()
    print("Goodbye.")

def get_year_from_user():
    print()
    year = int(input("Enter year, or 0 to finish: "))
    return year

def display_whether_a_leap_year(year):
    is_a_leap_year = check_if_a_leap_year(year)
    if is_a_leap_year:
        print(year, "is a leap year.")
    else:
        print(year, "is not a leap year.")

def check_if_a_leap_year(year):
    if year % 400 == 0:
        return True
    if year % 4 == 0 and year % 100 != 0:
        return True
    return False

main()
```