1. TRUE / FALSE QUESTIONS

_____You can write any program using only sequence structures.
_____A decision structure can be nested inside another decision structure.
_____A compound Boolean expression created with the `and` operator is true only when both subexpressions are true.
_____The if statement causes one or more statements to execute only when a Boolean expression is true.
_____Nested decision statements are one way to test more than one condition.
_____Python uses the same symbols for the assignment operator as for the equality operator.
_____In flowcharting, the _____ symbol is used to represent a Boolean expression.
_____Python provides a special version of a decision structure known as the _____ statement, which makes the logic of the nested decision structure simpler to write.
_____Boolean variables are commonly used as _____ to indicate whether a specific condition exists.
_____Python allows you to compare strings, but it is not case sensitive.
_____Short -circuit evaluation is only performed with the not operator.
_____Expressions that are tested by the `if` statement are called Boolean expressions.
_____An action in a single alternative decision structure is performed only when the condition is true.
_____Decision structures are also known as selection structures.

2. COMPLETION QUESTIONS: Fill in the blanks.

a) The _____ statement is used to create a single-alternative decision structure.
b) A(n) _____ statement will execute one block of statements if its condition is true or another block if its condition is false.
c) The logical _____ operator reverses the truth of a Boolean expression.
d) A(n) _____ expression is made up of two or more Boolean expressions.

3. ALGORITHM WORKBENCH QUESTIONS

Write assignment statements that perform the following operations

a) Adds `2` to `a` and assigns the result to `b`
b) Multiplies `b` times `4` and assigns the result to `a`
c) Divides a by `3.14` and assigns the result to `b`
d) Subtracts `8` from `b` and assigns the result to `a`
e) Increases variable `c` by `1`
f) Write an if statement that assigns `20` to the variable `y`, and assigns `40` to the variable `z` if the variable `x` is greater than `100`.

g) Write an if-else statement that assigns `0` to the variable `b` if the variable `a` is less than `10`. Otherwise, it should assign `99` to the variable `b`.

h) Write nested decision structures that perform the following: compares the `amount1` and `amount2` then display the greater of `amount1` and `amount2` to the screen.

MULTIPLE CHOICE QUESTIONS

4. A(n) _____ structure tests a condition and then takes one path if the condition is true, or another path if the condition is false.

a) if statement
b) single alternative decision
c) dual alternative decision
d) sequence

5. A(n) _____ expression has a value of either True or False.

a) binary
b) decision
c) unconditional
d) Boolean

6. Which logical operators perform short-circuit evaluation?

a) `or, not`
b) `not, and`
c) `or, and`
d) `and, or, not`

7. A (n) _____ structure is a logical design that controls the order in which a set of statements execute.

a) function
b) control
c) sequence
d) iteration

8. Multiple Boolean expressions can be combined by using a logical operator to create _____ expressions.

a) Sequential
b) Logical
c) Compound
d) Mathematical

9. In Python the _____ symbol is used as the equality operator.

a) `==`
b) `<>`
c) `<=`
d) `!=`

10. Which of the following is the correct if clause to determine whether `y` is in the range `10` through `50`, *inclusive*?

a) `if 10 < y or y > 50:`
b) `if 10 > y and y < 50:`
c) `if y >= 10 and y <= 50:`
d) `if y >= 10 or y <= 50:`

11. What is the result of the following Boolean expression, given that `x = 5, y = 3,` and `z = 8`?

```
x < y or z > x
```

a) `True`
b) `False`
c) `8`
d) `5`

12. What is the result of the following Boolean expression, given that `x = 5, y = 3`, and `z= 8`?

```
not (x < y or z > x) and y < z
```

a) `True`
b) `False`
c) `8`
d) `5`

13. Which of the following is the correct if clause to determine whether `choice` is anything other than `10`?

a) `if choice != 10:`
b) `if choice != 10`
c) `if choice <> 10:`
d) `if not(choice < 10 and choice > 10):`

14. When using the _____ logical operator, both subexpressions must be true for the compound expression to be true.

a) `or`
b) `and`
c) `not`
d) `either or or and`

PROGRAMS

15. When a bank account pays compound interest, it pays interest not only on the principal amount that was deposited into the account, but also on the interest that has accumulated over time. Suppose you want to deposit some money into a savings account, and let the account earn compound interest for a certain number of years. The formula for calculating the balance of the account after a specified number of years is:

$$A = P\left(1+\frac{r}{n}\right)^{nt}$$

The terms in the formula are:

A is the amount of money in the account after the specified number of years.
P is the principal amount that was originally deposited into the account.
r is the annual interest rate. For 5% interest rate *r* is 0.05
n is the number of times per year that the interest is compounded.
t is the specified number of years.

Write a program that makes the calculation for you.

The program should ask the user to input the following:

- The amount of principal originally deposited into the account
- The annual interest rate paid by the account
- The number of times per year that the interest is compounded

For example;

If interest is compounded monthly, enter 12.

If interest is compounded quarterly – every three months, enter 4.

- The number of years the account will be left to earn interest

Once the input data has been entered, the program should calculate and display the amount of money that will be in the account after the specified number of years.

NOTE: The user should enter the interest rate as a percentage. For example, 2 percent would be entered as 2, not as 0.02. The program will then have to divide the input by 100 to move the decimal point to the correct position.

Example Program Output

```
Enter the starting principal: 100
Enter the annual interest rate: 10
How many times per year is the interest compounded? 2
For how many years will the account earn interest? 4
At the end of 4 years you will have 147.75 $
```

16. Write a python program for a bank teller. In your program the user will enter the amount of the money to be withdraw as integer number. Then your program will calculate how many from each banknotes will be given. The program should aim to give minimum number of banknotes. Assume that available banknotes are 1, 10, 20, 50 and 100$.

For example, if the inputted value is 3237 then the program should say

```
100s:      32
 50s:       0
 20s:       1
 10s:       1
  1s:       7
```

Hint: *You may try using // or % in your program to determine the banknotes.*

Example Program Output

```
Enter how much money to be withdrawn: 1267
100s:    12
 50s:     1
 20s:     0
 10s:     1
 1s :     7
```

17. Use the turtle graphics library and write a program that reproduce the following object shown in the figure. You may choose size of the square shape as 200 pixel and radii of the circles as 50 pixels.