

DEPARTMENT OF COMPUTER SCIENCE

COSC202 (Object Oriented FORTRAN Programming) First Assignment

Deadline: 31st August, 2017

Format for Submission: Written or Typed on plain sheet (Only your Reg. No. is required)

1. Mention four (4) advantages of high-level languages?
2. What are the type and value of the following expression?

Expression	Resulting Value	Resulting Type
'120' > '62'		
15.5 + 6 / 4		
18 / 4 * 7 / 2		
'Ham' < 'Hamel'		

3. What does the following expression evaluate to? Assume the variable **a** is of type INTEGER and has value of 7, and variable **b** is of type REAL and has value of 3.3?

$$a/2 + 4 * b/3$$

4. Write a program that prompt a user for a sentence. The program should output the user's input.
5. Modify the program above by enclosing the code in a loop such that it prompt and output the user's input a number of times (say 10 times).
6. The program above loops a number of times before it ends. Modify the program such that instead of looping a specific number of times, it rather stops when the user's input is "QUIT".
7. Write a program which takes in a number from the keyboard and checks its size. If the number is less than 100, the program should print on screen "That is small", and if greater than or equal to 100 print something else appropriate.
8. What is the output of the following code snippet? Assuming **fee** and **speed** are integer (given **fee** = 0 and **speed** = 75):

```
IF (speed > 35) THEN
    fee = 20
ELSE IF (speed > 50) THEN
    fee = 40
ELSE IF (speed > 65) THEN
    fee = 60
END IF
print (*,*) speed
```

9. What is the output of the following code snippet? Assuming **sum** and **i** are integers?

```
sum = 0
i = 1
DO (i <= 15)
  IF (i < 5) THEN
    sum = sum + 1
  END IF
  IF (i < 10) THEN
    sum = sum + 2
  END IF
  IF (i < 15) THEN
    sum = sum + 3
  END IF
  i = i + 3
END DO
print (*,*) sum
```

10. Write a complete FORTRAN program that reads in two input values. The first value read in is a real number, R , and represents the radius of a circle. The second value read in is a single alphanumeric character, $CHAR$, and is used to determine if the program should calculate and output the circumference of the circle with radius R , the area of the circle with radius R , or the diameter of the circle with radius R . (If the user types 'C' for $CHAR$, calculate the circumference; if the user types 'A', calculate the area; if the user types 'D', calculate the diameter). Use the value 3.14159 for π .

Reference Formula:

Circumference: $2\pi R$

Area of a Circle: πR^2

Diameter of a Circle: $2R$

11. Write a complete program that will read in 5 integer values, then determine the two largest values of the 5 input values and finally print out these two largest values. Your program must prompt the user to inform how the input must be entered and must print out the input. All output must be printed in some readable manner.
12. Write a program to read some numbers from the terminal and store them in an array. Print out the content of the array. (You must decide the maximum size of the array).
13. Modify the above program to write out the numbers in reverse order.
14. Write a program that will calculate the answer to this math problem. Note the program should prompt the user to enter a value for x .

$$\sum_{x=1}^5 3x + 2$$

15. Devise a program that takes in three numbers from the keyboard, call them a, b and c, calculates the equation below and prints the result.

$$\sqrt{b^2 - 4ac}$$

The program should output error message if the values of a, b and c are such that b^2 is less than $4ac$. (i.e. the computer will not square root a negative number).

16. Write a program that accepts a, b and c from the keyboard and finds the roots of the quadratic equation:

$$ax^2 + bx + c = 0$$

Recall that quadratic equations have two roots. So your program should

- (a) Calculate and print the first root;
- (b) Calculate and print the second root;

The program should output error message if your values of a, b and c are such that b^2 is less than $4ac$. (i.e. the computer will not square root a negative number).

To verify the correctness of your program, try running your program using $a=2, b=5, c=2$; then try $a=2, b=5, c=5$.