A2 CS T1 [50 marks]

Wednesday, July 30, 2025 4:35 PM

Q1:

Study the following pseudocode for a recursive function.

```
FUNCTION Unknown(BYVAL X, BYVAL Y : INTEGER) RETURNS INTEGER
  IF X < Y THEN
    OUTPUT X + Y
    RETURN (Unknown(X + 1, Y) * 2)
  ELSE
    IF X = Y THEN
      RETURN 1
    ELSE
      OUTPUT X + Y
      RETURN (Unknown(X - 1, Y) DIV 2)
    ENDIF
  ENDIF
ENDFUNCTION
```

The operator `DIV` returns the integer value after division e.g. `13 DIV 2` would give `6`

(a) Write program code to declare the function `Unknown()`. /4

(b) The main program needs to run all **three** of the following function calls and output the result of each call:

```
Unknown(10, 15)
Unknown(10, 10)
Unknown(15, 10)
```

(i) For each of the **three** function calls, the main program needs to:

- output the value of the two parameters
- call the function with those parameters
- output the return value.

Write the program code for the main program. /3

(ii) Take a screenshot to show the output from **part (b)(i)**. /2

(c) Rewrite the function `Unknown()` as an iterative function, `IterativeUnknown()`. /7

(d) The iterative function needs to be called **three** times with the same parameters as in **part (b)**.

(i) For each of the **three** function calls, the main program needs to:

- output the value of the two parameters
- call the iterative function with those parameters
- output the return value.

Amend the main program to perform these tasks. /2

(ii) Take one or more screenshots to show the output of both functions for each set of parameters. /2

Q2: Check if a number is Palindrome [words spelled same backwards] /10
e.g Radar is palindrome, Hello is not

Q3: Count occurences of a character inside a string /10

Q4: Reverse a string /10