Software Development

Pseudocode

Task 1

Students are graded out of 10 for assignments.

A+	10
A	9
B+	8
B	7
C+	6
C	5
D+	4
D	3
E+	2
E	1
Fail	0

This is the current pseudocode being used:

```
IF student's grade is equal to 10
        PRINT "passed"
ELSE
        PRINT "failed"
```

1. What are the main problems with the pseudocode?

2. Re-write the pseudocode to show the marking structure above:
   (Hint: If you run out of space, you can use the back of the sheet.)

Task 2

```
READ length, width
        area ← length * width
PRINT area
```

1. What data type is *length*? _____
2. What data type is *width*? _____
3. What does the ← mean? _____
4. What data does the variable *area* store?

_____

_____

_____

5. What does the last line of pseudocode do?

_____

_____

_____

6. Re-write the pseudocode to find the dimensions of the perimeter of the rectangle.

Task 3

Martin wants to be able to type in the length of a square's side, but if he types in a negative number, he must receive an error message.

Write the pseudocode below:

Martin now wants the program to print the square's area and perimeter.

What pseudocode will you include into your program? Re-write the pseudocode below.

Task 4

Gareth wants to input three numbers using these variables: *n1*, *n2* and *n3*. He wants the program to check if the three numbers are equal or not, it will display either of these messages: “All 3 are equal”, or “not all equal”.

Write the pseudocode below:

Gareth now wants the code to be extended and include a print out of which of the largest number of the three that have been typed in.

Task 5

```
SET total to zero
SET grade to one
WHILE grade counter is less than or equal to ten
        INPUT the next grade
        ADD the grade into the total
PRINT total
```

1. Explain what the pseudocode does:

2. Mark in **red** the variables in the pseudocode

3. What are the words in CAPITALS called? _____

4. What happens if the grade counter is greater than 10? Explain.

5. What can be done to solve this problem?

Task 6

Write the pseudocode for displaying the numbers 1 to 10 inclusive, try to use a while loop:

Write the pseudocode to display the numbers 2 to 20 inclusive, using a for loop:

Task 7

```
INPUT start, finish
FOR n ← start to finish
        PRINT n
END FOR
```

Explain what this pseudocode does.

Using the code above, re-write the pseudocode to include printing the integers from start to finish inclusive. But if start is bigger than finish, don't print the numbers, print an error message instead.

Task 8

```
count ← 1
WHILE count is less than or equal to 30
        IF count is less than or equal to 10
                PRINT "less than 10."
        ELSE IF count is less than or equal to 20
                PRINT "less than 20."
        ELSE IF count is less than or equal to 30
                PRINT "less than 30."
        ELSE
                PRINT count
Add one to count
```

1. What data type is count ? _____
2. What does the ← mean? _____
3. Why do you think count is set to 1? What difference does this make in the code?

4. What is the purpose of a while loop?

Task 9

Using a for loop, input 10 numbers and print their total.

Write the pseudocode below:

Using the pseudocode you wrote above, re-write it to include that if any numbers above 100 are entered, they are ignored and should not be totalled.

Using the pseudocode above, re-write it and add an error message if any numbers are input above 100.

Task 10

```
PRINT Starting Loop
FOR number in 1, 2, 3, 4, 5
        IF number == 2
                PRINT the number is 2
        PRINT numbers printed
PRINT End of loop
```

1. What does the for loop do?

2. What are the numbers in the second line used for?

3. What does the IF statement do?

4. Explain what the PRINT statements do.

Statement 1:

Statement 2:

Statement 3:

Statement 4:

Task 11

This is pseudocode for playing a game of Monopoly, also showing one person's move while playing the game.

```
MAIN Monopoly_Game
        Hand out each player's initial money.
        Decide which player goes first.
        REPEAT
                Call Funciton Monopoly_Move for next player.
                Decide if this player must drop out.
        UNTIL all players except one have dropped out.
        Declare the surviving player to be the winner.

FUNCTION Monopoly_Move
        Begin one's move.
        Throw the dice.
        Move the number of spaces on the board shown on the dice.
        IF the token landed on "Go to Jail,"
                THEN go there immediately.
        ELSE IF the token landed on "Chance" or "Community Chest,"
                THEN draw a card and follow its instructions.
        ELSE
                follow the usual rules for the square (buying property, paying rent, collecting
                $200 for passing "Go", etc.).
  END one's move.
```

Write the pseudocode for Simon Says: (if you run out of room, use another piece of paper)

Task 12

Turn this story into pseudocode:

Mum needs to go grocery shopping. She checks whether she has the list of items she wants to buy, she also checks if she has enough money. She dives the car to the shops. She goes over the trolley collection bay and selects an empty trolley. She then walks up and down the aisles putting the items into the trolley, marking the items off her list as she goes. When she has all the items she goes to the checkout. She pays for the items. Puts them in the car, returns the empty trolley and drives home.

Task 13

James wants a program show the price of an item including 10% GST, display the ex-tax price and the tax component. To find the correct GST component divide by 11, not 10.

Write the pseudocode below:

With the above pseudocode, re-write it so James can type in 5 different items and see the total price (with and without GST). Hint: use a while loop.

Write the pseudocode below:

Task 14

```
START
        word ← "noodles"
        PRINT "Enter the password"
        INPUT password
        WHILE Password is not equal to Word
                PRINT "Wrong password  - try again"
                INPUT password
        END WHILE
STOP
```

1. There are errors in the pseudocode above, keep in mind, they are not obvious. Circle them in **red**. Explain what would happen in this program if the errors weren't found.

2. Explain what the while loop does.

3. What is the symbol you could write instead of the words "*not equal to*"?

4. Re-write the pseudocode to stop allowing the incorrect password to be entered more than three times.

Task 15

```
START
        frogs ← "green"
        horses ← "brown"
        cows ← "black"
        chooks ← "white"
        word = ""

        IF word = "frogs"
                PRINT
        END IF
        IF word = "horses"
                PRINT "brown"
        END IF
        IF word is equal to "cows"
                PRINT black
        END IF
        IF word is equal to chooks
                PRINT white"
        END IF
STOP
```

1. Mark all errors in **red**, show how you would fix them.
2. Re-write the pseudocode so that it is more concise and accurate.

Task 16

Write pseudocode to print an input temperature. The program should check the input data and print a message to say whether it is freezing or boiling. If an inappropriate number or character is input it displays an error message. The pseudocode must use all appropriate techniques, symbols and structures.

Task 17

Farmer Jo has just purchased a Skwerter 2000, a machine that sprays pesticide on the backs of sheep. Farmer Jo has loaded his 200 sheep into the Skwerter 2000. He is uncertain how many white or black sheep he has in his flock. Farmer Jo also needs to spray each sheep once, white sheep with pink spray, black sheep with blue spray. The blue spray squirts 13 sheep, the pink sprays 18. The Skwerter 2000 will automatically count each sheep as it is squirted.

How many sheep of each colour are there in the flock? How many sheep were squirted with pink or blue spray? Hint: use random.