PSEUDOCODE PROBLEM SET 1:

1. User inputs a number, program reports if the number is above 5

2. User inputs 3 numbers, program outputs the numbers in the opposite order

3. User inputs 2 numbers, if the first one is larger, it outputs their sum, if the second one is larger, it reports their difference

4a. User inputs a number, the program counts up from zero to that number.

4b. Now, for every other number, the program outputs "boo" , e.g. 0, "boo", 2, "boo".

5. Create a needy program that will keep on asking user for hugs until user inputs any phrase including the word "hug".

6. Create a program that can convert percentage change to actual change, e.g. user enters old size, percentage change and the units and outputs the actual increase in units, e.g. 20, 10%, kg will output 2 kg.

7. User inputs an integer, the program outputs a half of the integer, rounded down, and if that half is odd or even, e.g. if user inputs 7, the half of it rounded down is 3 which is odd.

8. User inputs the volume of sphere, the program outputs the radius.

9. A car can carry up to 5 people and generates 200 g of CO2 per mile, a bus can carry 40 people and generates 1000 g of Co2. Write an algorithm to find out which car is more environmentally friendly, and output the name of that type of transport.

10. Write the algorithm to count up from 1 to 30, outputting the numbers as it goes along and outputting exclamation marks next to all numbers divisible by both 3 and 4.

11. User inputs two numbers, a and b, the program will output all the powers of a, e.g. a*1, a*a, a*a*a, up to b. b can't be less than 2.

12. User inputs two positive numbers, the program counts up from the smaller of these numbers to the larger, outputting the numbers as it counts up.

13. User inputs 3 names of people, the program returns all of their lenghts (e.g. "Bob" is 3 characters in length).

14. User inputs 3 names of people, the program returns the longest name and its length,
(e.g. if "Bob", "Jeremy" and "Caspasius" have been input, "Caspasius", 9 will be output).

15. What will be the output of the algorithm below?
```
i=5
j=0
WHILE i<10 DO
        PRINT j
        j=i*2
        i=i+1
END WHILE
```

16. What will be the output of the algorithm below?
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i=5
j=0
WHILE i=<10 DO
        PRINT j
        j=i*2
        i=i+1
END WHILE
```

17. What will be the output of the algorithm below?
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i=5
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WHILE j<10 DO
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END WHILE
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i=5
j=0
WHILE i<10 DO
        PRINT j
        j=i+j
        i=i+1
END WHILE
```

19. User inputs a word, the program outputs all the letters of that word

20. User inputs a word, the program outputs the middle letter of that word, e.g. if "Jeremia" is input, it will output "e",
if "Jeremy" is input, and the word length is an even number without a middle value, the program will divide in 2 and round DOWN and output "r".

21. User inputs a word, the program outputs all the letters of that word but every other letter
(e.g. "monkey" would result in "m", "n", "e")

22. User inputs a word, the program outputs the first and the last letters of that word

23. User inputs a word, the program outputs the second and the second last letters of that word, minimal length is 5 characters.

24. User inputs the price of an item and the banknote given. The program will output the change due to the customer.
The price of the item must be less than the banknote given, otherwise the program outputs "Insufficient amound paid"

25. The program counts up 0 to 100 and also outputs the counter and one of the words "Tic", "Tac" alternatively, e.g. 0 "Tic", 1 "Tac", 2 "Tic", 3 "Tac", etc.
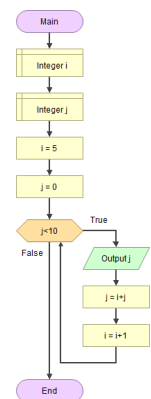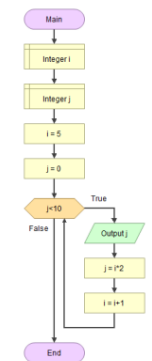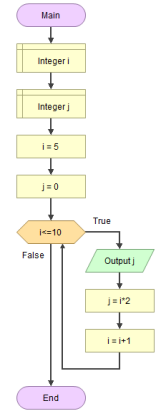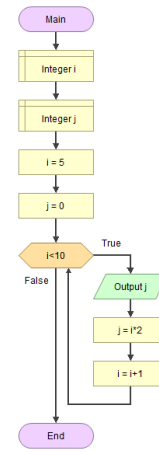
26. User inputs the price of an item and the banknote given (must be 1, 2, 5, 10, 20, 50 pound notes only).
The program will output the change needed.
The price of the item must be less than the banknote given, otherwise the program outputs "Insufficient amound paid"

27. Given a list of words, the program will output 3 random things in a sequence. e.g. "cactus","fish","goat"
words=Array["donkey","cactus","fish","goat"]
FOR i=0 TO 3
        r=RANDOM_INTEGER(0,SIZE(words))
        OUTPUT words[r]
NEXT i

28. Given a list of words, the program will ask user to input a word and will search its list for a match.
If match is found, the program will output the index at which the inputted word is found, otherwise
it would output "not found", e.g. in a list "donkey","cactus","fish","goat", if the user inputs "cactus"
the program should output "found at index 1", if "zebra" is input, the output is "zebra not found"

29. Given a list of words, the program will output 2 of them randomly, putting the word "and" between them and
" are the best friends!" after when priting, e.g. "cactus and goat are best friends"

30. A user is looking for a algorithm that would efficiently output the following phrase "and 1 and 2 and 3 and 4 and 5
and 6 and 7 and 8"

31. The user is looking for a algorithm that would efficiently output the following phrase "1 and 2 and 3 and 4 and 5 and
6 and 7 and 8"

32. The user is looking for a algorithm that would efficiently output the following phrase "1 and 8 or 2 and 7 or 3 and 6
or 4 and 5 or 5 and 4 or 6 and 3"

33. Write an algorithm that will create a string array from the names of all files in a folder, reporting back the names of
the files as a numbered list.

34. A known computer virus leaves this signature in infected files: "DeathJeffLOLZ". Write an algorithm that will open all
files in a folder
and scan them for that signature, reporting back the names of the files infected.

35. Given a nested list (a 2D array) of names and numbers, display them as in columns separated by tabs.

35B. Given an array a[6,9,2,4] output the second item

37. Given an array a[6,9,2,4] output all items, then same but backwards

38. Given an array a[6,9,2,4] output all items

39. Given an array a[6,9,2,4] output every other item

40. Given a[6,9,2,4], write the code that will swap the first and the third item [2,9,6,4],

42. Create a flowchart and pseudocode for the following program: User enters a word and the program spells it one character at a time.

43. User inputs a word in upper case, the algorithm converts it to lower case. This is based on the fact that in the ASCII table, upper case letters are 32 letters below the lower case ones.
Consider this printout from Python (in Pseudocode we can use ToChar(x) to convert an integer to an ASCII character and ToCode("a") to convert an ASCII character to an integer representing this character's ASCII position:
>>> ord("A")
65
>>> ord("a")
97
>>> ord("a")-ord("A"),ord("b")-ord("B")
(32, 32)
>>> chr(65),chr(97)
('A', 'a')
>>>

44. The program is to ask user for two words and then output the first two characters of the fir word and the last two characters of the second word.

45. Given a 1D integer array, the program will iterate (step through it) through the array and fo any element larger than 10, it will subtract 10 from that element
and display the element (both adjusted and unadjusted).
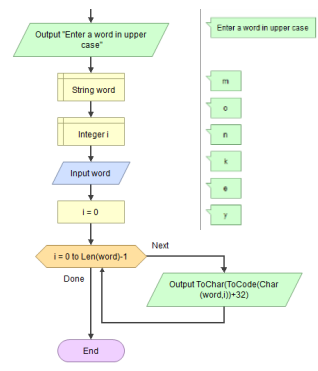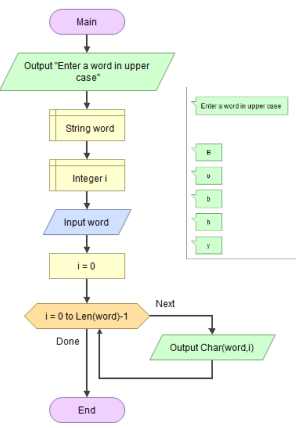e.g. if the array holds [3,6,1,23], the output will be 3, 6, 1, 13 because 23>10, so 23-10=13

46. Given a 1D integer array, the program will iterate (step through it) through the array and fo any element smaller than 10, it will add 10 to that element
and display the element (both adjusted and unadjusted).
e.g. if the array holds [3,6,1,23], the output will be 3, 6, 1, 13 because 23>10, so 23-10=13

47. Given a 1D integer array, the program will iterate (step through it) through the array and output every element and its preceding and the
following element, if the array holds [3,6,1,23], the output will be "3 is first, 6 is after 3 and below 1, 1 is after 6 and before 23, 23 is last"

48. Given a 1D integer array, the program will iterate (step through it) through the array and find the difference between an element and
the one immediately preceding it, then write those differences into another array, e.g. if the array holds [3,6,1,23], the resulting array will be [3,-5,22] from 6-3, 1-6, 23-1
The program will then output the resulting array of differences.

49. Given a 1D integer array, the program will the length of the array (how many elements it), the sum of all integers, and the first and the last elements

50. Given a 1D integer array, the program will iterate (step through it) through the array and output the elements and whether they are odd or even.

51. Given a 1D integer array, user enters a number. The program returns "found" if that number is amongst the elements of the array, or "not found" if it's not.
e.g. if the array is n=Array[3,6,1,23] and the user inputs 1, the output will be "found", if they enter "7" it will be "not found".

52. Given a 1D integer array, user enters a number. The program returns "found" if that number is amongst the FIRST half of the elements of the array, or "not found" if it's not.
e.g. if the array is n=Array[3,6,1,23] and the user inputs 1, the output will be "found", if they enter "1" it will be "not found" because [3,6] is the first
part of the array and it doesn't contain 1. We can find the first half of the array by searching up to LENGTH(n) divided into 2 and rounded down (integer DIV).

```
n=Array[3,6,1,23]
INPUT x
i=0
found=False
WHILE found=False AND i<(LENGTH(n) DIV 2)
        IF n[i]=i THEN
                found=True
        ELSE
                i=i+1
        END IF
END WHILE
IF found=True THEN
        OUTPUT "found"
ELSE
        OUTPUT "not found"
```

53. Given a 1D integer array, user inputs a number. The program returns that number's index if that number is amongst the elements of the array, or "not found" if it's not.
e.g. if the array is n=Array[3,6,1,23] and the user inputs 1, the output will be "found", if they enter "7" it will be "not found".

54. User has a file called "pups.txt" that has the following format:
Bobby
Johnny
Amir
Cecilius
Write a program that will read this file into a 1D array of string elements. The array will hold up to 20 elements.

55. User has a file called "pups.csv" that has the following format:
Bobby, 33
Johnny, 22
Amir, 56
Cecilius, 78
Write a program that will read this file into a 2D array of string elements. The array will hold up to 20 elements. Output the name with the highest number of points. E.g. Cecilius

56. User inputs a word and the program will display every other letter in alternating case: upper/lower, e.g. "Hello people" will become "HeLlo PeOpLe"

57. A teacher needs to count all pupils who did their homework and all those who didn't and output the totals for both in the end.

58. A teacher needs to count all pupils who did their homework and all those who didn't and output the totals for both in the end, while entering those who didn't into a special detention list.

59. Write a program that will count an approximate number of characters in a book, given the input from a user of average characters per word, avg words per line, and avg lines per page, as well as the number of pages, e.g. if there are 200 pages, with average of 30 lines per page and average of 10 words per line and 6 characters per word, we should get 360,000 characters in that book.

60. We have two arrays, of 4 elements each. The first array contains names,
the other array contains integers representing points earned by each of the names in the other array.
The program iterates through both arrays, displaying the elements side by side, e.g. given
["Bob","Cecil","Nora","Amir"]
as names, and [45,34,89,100] as integers, the program will output "Bob: 45 points", "Cecil: 34 points", etc.

61. We have two arrays, of 4 elements each. The first array contains names,
the other array contains integers representing points earned by each of the names in the other array.
The program iterates through both arrays, displaying the elements side by side, e.g. given
["Bob","Cecil","Nora","Amir"]
as names, and [45,34,89,100] as integers, but only for those who have over 40 points, so the program will output
"Bob - 45 points", "Nora - 89 points", etc, leaving out Cecil who scored fewer than 40 points.

62. We have two arrays, of 4 elements each. The first array contains names,
the other array contains integers representing points earned by each of the names in the other array.
The user inputs a name, the program finds the matching name in the first array, remembers its index,
then it outputs the element from the integer array that is at the same index as the match.
If no match is found, the error code of "-999" is output.

63. A user has a list of prices [12,59,23,101] and would like to see each prices with and without VAT, with and
without 10% early bird discount, and with and without the 15% surcharge for overseas customers.

64. A program needs to write "Bob was here" into a text file called "memories.txt"

A program needs to ask a user to write down 3 of their favourite Pikachu characters and write them into a text file
called "p.txt"

65. A program needs to ask a user to write down any number of their favourite Pikachu characters and write them
into a text file called "p.txt"

66. Given an array of strings, the program needs to write all of its elements to a file called "data.txt"

67. We have two arrays, of 4 elements each. The first array contains names,
the other array contains integers representing points earned by each of the names in the other array.
The program needs to write each element of the names array, followed by a comma, followed by an element
of the integer array with the same index, to each new line in a file called "data.csv"

68. We have two arrays, of 4 elements each. The first array contains names,
the other array contains integers representing points earned by each of the names in the other array.
The program needs to write each element of the names array, followed by a comma, followed by an element
of the integer array with the same index, to each new line in a file called "data.csv" BUT ONLY IF
the integer element is over 40, e.g. Cecil will not be written as he only has 34 points.

68. Given a table of integers, the program will ask user for a column number and return the total of that column,
e.g.

4	7	12	10
2	1	8	9
14	9	3	7

if the user inputs "0", they will see 20 (which is 4+2+14)

69. Given a table of integers, the program will ask user for a row number and return the total of that row, e.g.

4	7	12	10
2	1	8	9
14	9	3	7

if the user inputs "0", they will see 33 (which is 4+7+12+10)

70. The user wants to write two procedures which are selectable via a menu from the main screen. e.g. when the
program runs, the user
might see "Press 1 to hear praise, 2 to hear a put-down" where praise and put-down are defined in their respective
procedures