Practical Exercise 5

(2 Marks, due in Week 6)

Task 5.1

Write a recursive function, `power`, that takes two integers x and y as parameters such that x is nonzero and returns x^y. You can use the following recursive definition to calculate x^y:

If $y \geq 0$,

$$power(x,y) = \begin{cases} 1, & y = 0; \\ x, & y = 1; \\ x \times power(x, y-1), & y > 1. \end{cases}$$

If $y<0$,

$$power(x,y) = \frac{1}{power(x,-y)}.$$

Also, write a main function to test your function.

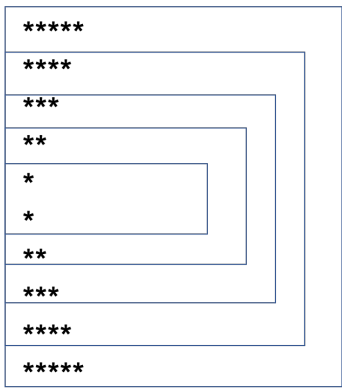
Task 5.2

Write two nested recursive functions to generate the following pattern of stars with n stars in the first line (here `n=4`):

```
****
***
**
*
*
**
***
****
```

Hint:

1. *For these two recursive functions, the first one, say* `printStars(int n)`*, is used to print a line of* `n` *stars; the second one,* `printLines(int m)`*, is to print* `m` *pairs of lines.*
2. *Think in the way that the whole picture is generated in the following pattern:*



Task 5.3

Download and run the code *TicTacToe_Minimax.zip* under Practical 5. Read the code, *MiniMaxPlayer.h* and related code. Convert the functions *getMove*, *maxMove* and *minMove* into pseudo-code. You may use plain language or simplified source code to write the pseudo-code. Explain the algorithm of Minimax Player using the pseudo-code you created to your tutor to demonstrate your understanding, especially the nested recursion.

Task 5.4 (Assignment 1 pre-check)

Complete Tasks 1 & 2 of **Assignment** 1 and demonstrate your code to your tutor.