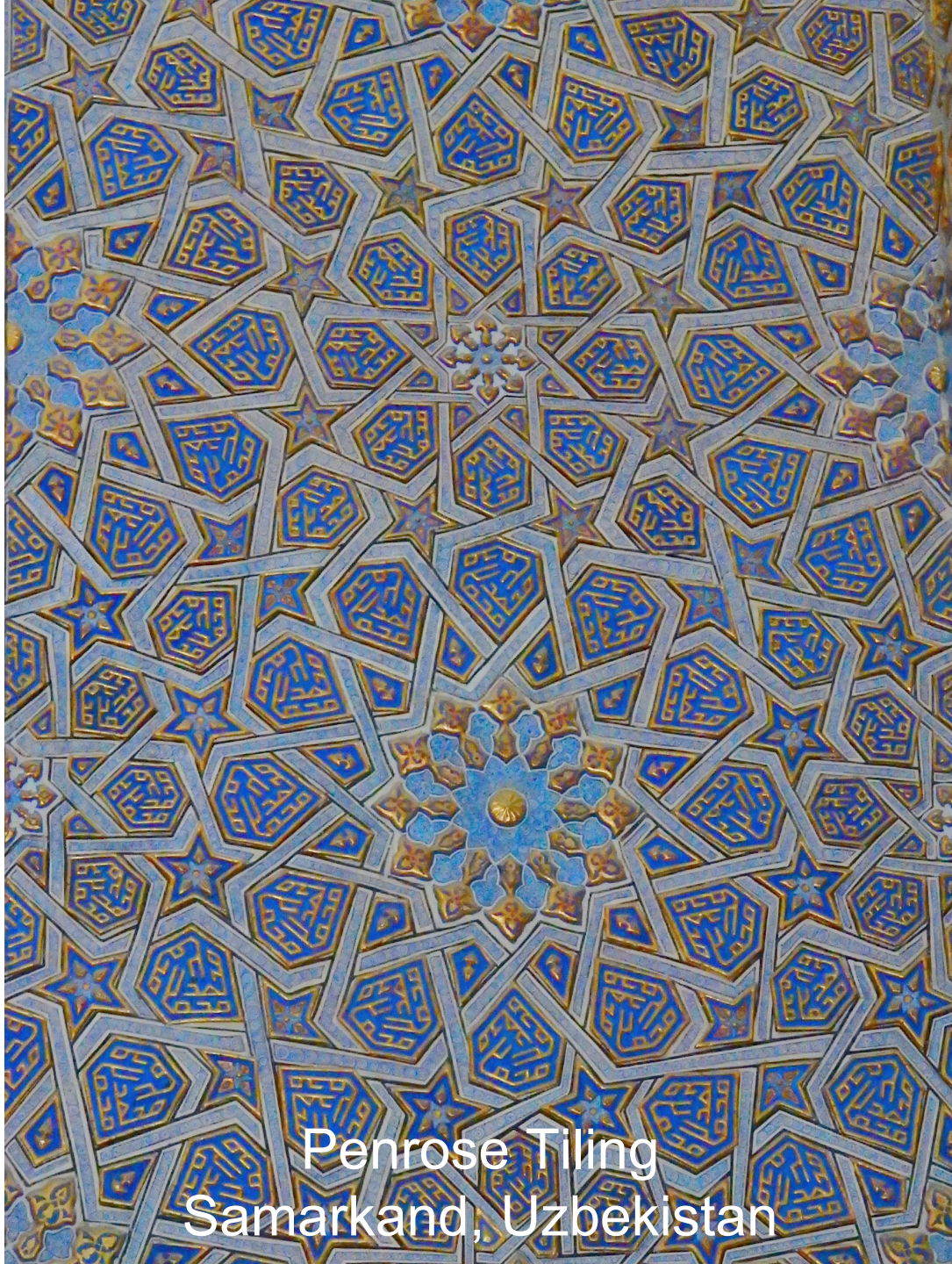
COMP20007 Design of Algorithms

Week 2



Penrose Tiling
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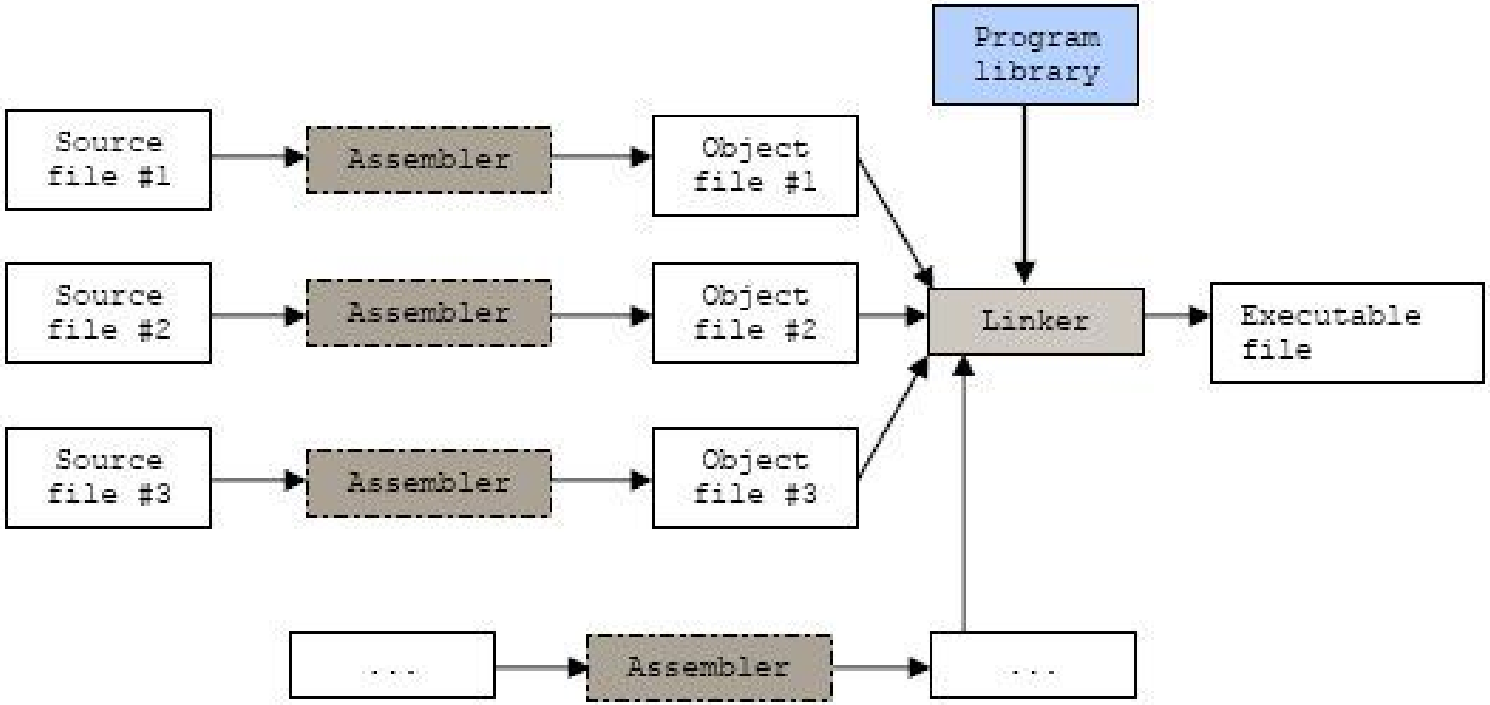
Administrivia

1. Participating in tutes
2. Tute solutions
    - Students posting them
    - Me posting them
3. Lecture capture only gets left projector
4. How to study for COMP20007

Questions since last lecture: What's a .o file?

- Object code, Machine code
- Compiler, Linker, Loader

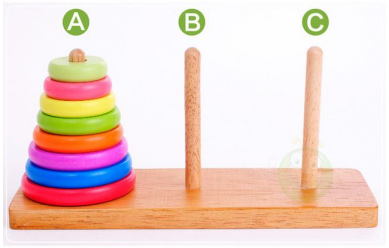


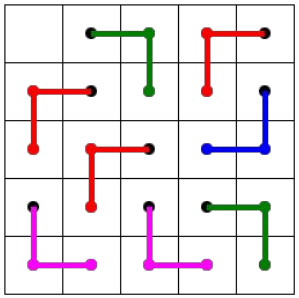
Master Theorem (including sketch proof)

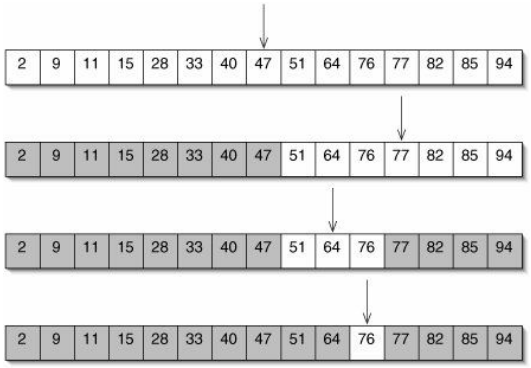
$$T(n) = aT(\lceil n/b \rceil) + O(n^d)$$

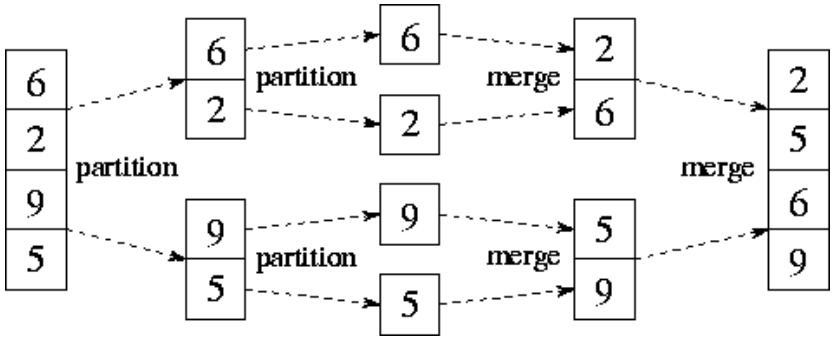
$$T(n) = \begin{cases} O(n^d) & \text{if } d > \log_b a \\ O(n^d \log n) & \text{if } d = \log_b a \\ O(n^{\log_b a}) & \text{if } d < \log_b a \end{cases}$$

Examples









$$XY = \begin{bmatrix} A & B \\ C & D \end{bmatrix} \begin{bmatrix} E & F \\ G & H \end{bmatrix} = \begin{bmatrix} AE+BG & AF+BH \\ CE+DG & CF+DH \end{bmatrix}$$

$$XY = \begin{bmatrix} P_5+P_4-P_2+P_6 & P_1+P_2 \\ P_3+P_4 & P_1+P_5-P_3-P_7 \end{bmatrix}$$

$$\begin{aligned} P_1 &= A(F-H) \\ P_2 &= (A+B)H \\ P_3 &= (C+D)E \\ P_4 &= D(G-E) \end{aligned}$$

$$\begin{aligned} P_5 &= (A+D)(E+H) \\ P_6 &= (B-D)(G+H) \\ P_7 &= (A-C)(E+F) \end{aligned}$$

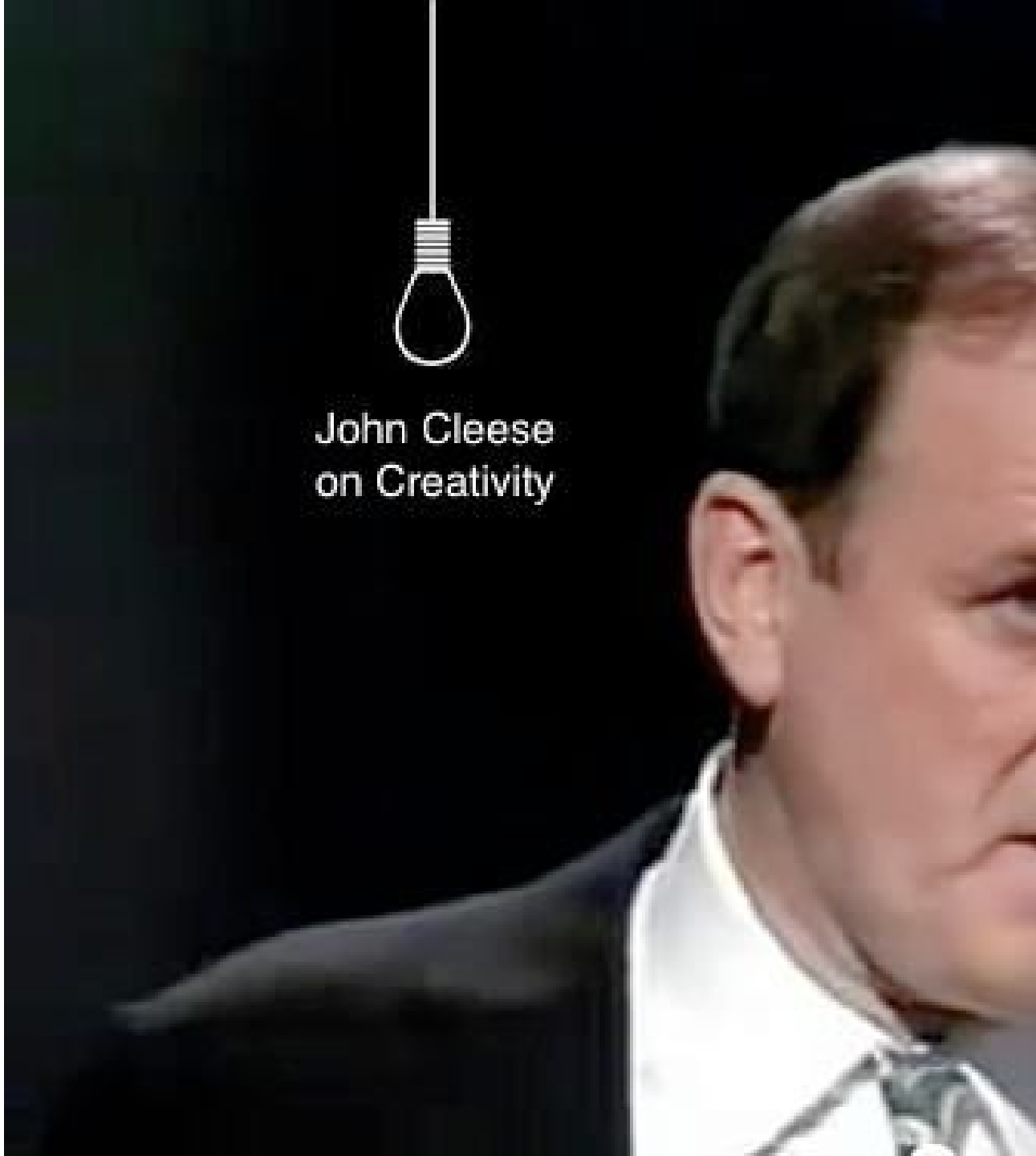
For next week

Read DPV 3.1, 3.2

Finish week 2 lab and tute

Prepare for week 3 lab and tute

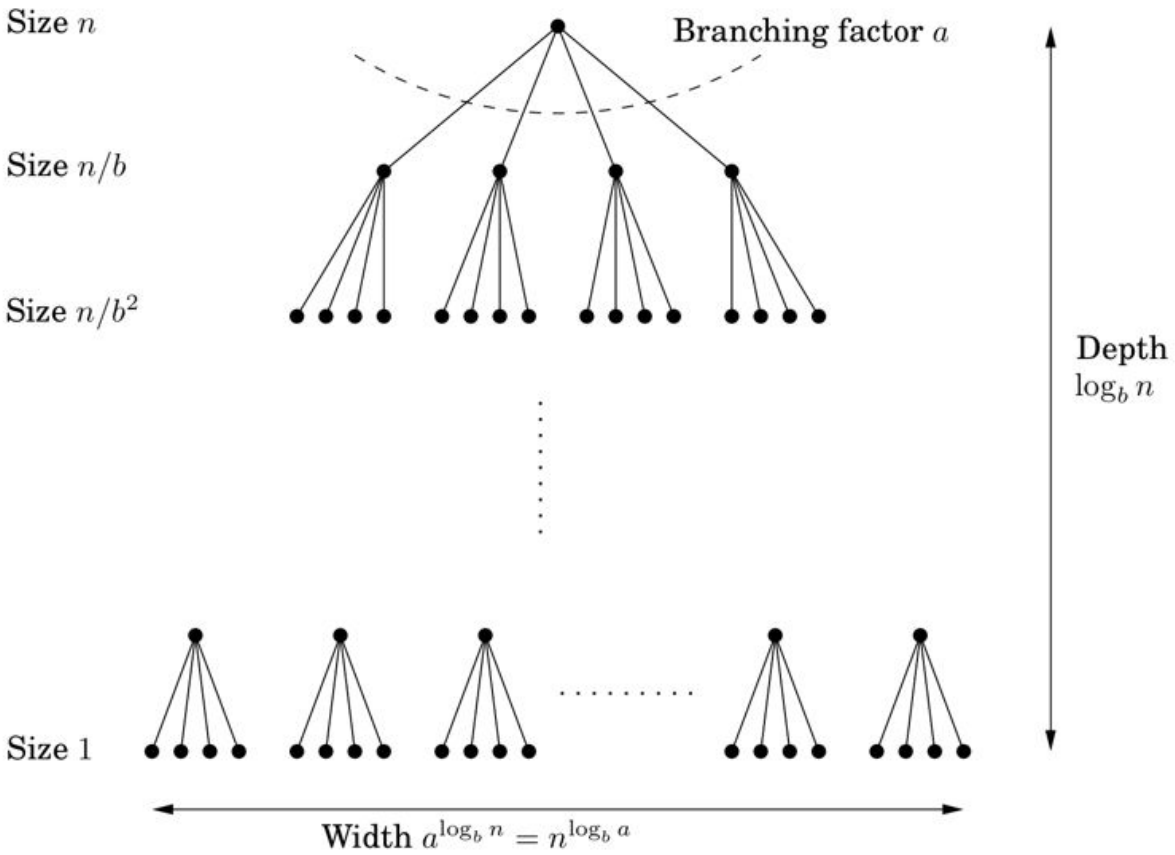
Not just for fun: John Cleese on Creativity



Addendum: Master Theorem (not examinable)

See DPV p55 for explanation of the three clauses of the Master Theorem

Figure 2.3 Each problem of size n is divided into a subproblems of size n/b.



NB sum of geometric series