


Algorithmics	Student information	Date	Number of session
	UO:276824	17/03/2021	3.1
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## Activity 1. Basic recursive models.

**A brief explanation for each of the given classes indicating how you calculated the complexity of that class.**

Division 1: It has  $a=1$ ,  $b=3$  and  $k=1$  since it is a division and  $a < b^k$  it means that its complexity is  $O(n^k)$  that is  $O(n)$ .

Division 2: It has  $a=2$ ,  $b=2$  and  $k=1$  since it is a division and  $a = b^k$  it means that its complexity is  $O(n^k * \log n)$  that is  $O(n * \log n)$ .

Division 3: It has  $a=2$ ,  $b=2$  and  $k=0$  since it is a division and  $a > b^k$  it means that its complexity is  $O(n^{\log_b a})$  that is  $O(n)$ .

Subtraction 1: It has  $a=1$ ,  $b=1$  and  $k=0$  since it is a subtraction and  $a = 1$  it means that its complexity is  $O(n^{k+1})$  that is  $O(n)$ .

Subtraction 2: It has  $a=1$ ,  $b=1$  and  $k=1$  since it is a subtraction and  $a = 1$  it means that its complexity is  $O(n^{k+1})$  that is  $O(n^2)$ .

Subtraction 3: It has  $a=2$ ,  $b=1$  and  $k=0$  since it is a subtraction and  $a > 1$  it means that its complexity is  $O(a^{n \div b})$  that is  $O(2^n)$ .

**A brief explanation for each of the two new classes indicating how you calculate the complexity to get the requested one.**

Division 4: It has  $a=4$ ,  $b=2$  and  $k=0$  since it is a division and  $a > b^k$  it means that its complexity is  $O(n^{\log_b a})$  that is  $O(n^2)$ .

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Subtraction 4: It has  $a=3$ ,  $b=2$  and  $k=0$  since it is a subtraction and  $a > 1$  it means that its complexity is  $O(a^{n \div b})$  that is  $O(3^{n/2})$ .