

## Sheet 2

1. Write a Python class, Flower, that has three instance variables of type str, int, and float, that respectively represent the name of the flower, its number of petals, and its price. Your class must include a constructor method that initializes each variable to an appropriate value, and your class should include methods for setting the value of each type and retrieving the value of each type.
2. The CreditCard class in the lecture initializes the balance of a new account to zero. Modify that class so that a new account can be given a nonzero balance using an optional fifth parameter to the constructor. The four-parameter constructor syntax should continue to produce an account with zero balance.
3. The number of operations executed by algorithms A and B is  $8n\log(n)$  and  $2n^2$ , respectively. Determine  $n_0$  such that A is better than B for  $n \geq n_0$ .
4. The number of operations executed by algorithms A and B is  $40n^2$  and  $2n^3$ , respectively. Determine  $n_0$  such that A is better than B for  $n \geq n_0$ .

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5. Order the following functions by asymptotic growth rate.

  $3n + 100\log(n)$

  $4n$

  $2^n$

6. Order the following functions by asymptotic growth rate.

  $n^2 + 10n$

  $n^3$

  $n\log(n)$

7. Show that  $(n+1)^5$  is  $O(n^5)$ .

8. Show that  $2^{n+1}$  is  $O(2^n)$

9. Show that  $n^2$  is  $\Omega(n\log(n))$ .

10. Show that  $n\log(n)$  is  $\Omega(n)$ .