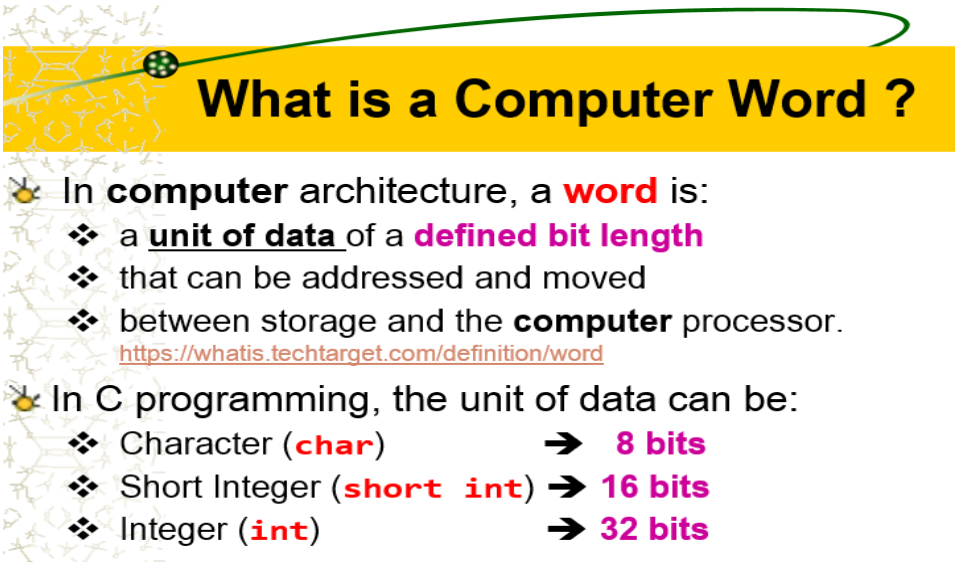
Computer word



Practice Exercise 1: Finding the Bit-Pattern

Write the code of the function that will display the bit-pattern of a given integer.
Instructions:

1) **Use bit manipulation operators ONLY and if applicable.**
   a) **Shift Operators : >> <<**
   b) **Bitwise operators: & ^ | ~**
2) **The code should be platform independent [Hint: Use sizeof operator to determine the number of bits representing the integer variable].**
3) **No array should be used in this function.**
4) **In displaying the bits, group them by 4's and put a space in between groups.**

Computer Word vs. Bit-Vector Implementation of Sets

In Mathematics	Bit-Vector	Computer-Word Implementation

//Universal Set U
U = { 0, 1, 2, 3, 4, 5, 6, 7 }
Set A = {7, 0, 4, 2}
	Set A
	0 1
	1 0
	2 1
	3 0
	4 1
	5 0
	6 0
	7 1
		Set A
		2^7 2^6 2^5 2^4 2^3 2^2 2^1 2^0
		1 0 0 1 0 1 0 1
		Set A is implemented using computer word:
		If x ∈ A, then the bit position with place value 2^x is 1.
		❖ Example: 4 ∈ A, then the bit Position: 2^4 is 1
		If x ∉ A, then the bit position with place value 2^x is 0.
		❖ Example: 5 ∉ A, then the bit Position 2^5 is 0.

Bit-vector implementation: Elements of the universal set are used as **indices of the array** and the array component is either 1 or 0 depending on whether the element is a member of the set or not.

Computer word implementation: Elements of the universal set are used as exponents of 2 to represent the place value of the binary system and each bit in the computer word is either 1 or 0 depending on whether the elements is a member of the set of not.

Practice Exercise 2: Computer word implementation of sets

In Mathematics	Computer-Word Implementation

//Universal Set U
U = { 0, 1, 2, 3, 4, 5, 6, 7 }
Set A = {7, 0, 4, 2}
	Set A
	 
	
	Data type definition:
	`typedef char Set;`
	`typedef enum {TRUE, FALSE} boolean;`
	
	Based on the definition, write the code of the following functions:
	1) isMember() – given the set and the element, the function will return TRUE if the element is in the set, otherwise return FALSE .
	2) insert() – the function will insert the given element if the element does not yet exist in the given set.
	3) delete() – the function will remove the given element from the given set if it exists in the set.