

Arrays and Pointers Solutions

- What happens when the name of an array is used where the compiler expects to see a pointer?
 - The name “decays” into a pointer to the first element
- Explain what is meant by an array index
 - An array index is a number which gives the position of an element in the array (0 for first element, 1 for second element, etc)

- Explain what is meant by a pointer offset
 - An offset is a number which is added to a pointer to give another address
- What is the relationship between these two concepts?
 - If the pointer is the first element in the array, then an offset of n will give the address of the element with index n

- What happens when a pointer to an array element is incremented?
 - It gives the address of the next element in the array
- What happens when a pointer to an array element is decremented?
 - It gives the address of the previous element in the array
 - (Assuming in both cases that the pointer does not step outside the bounds of the array)

- Write a simple program which uses pointers to iterate over the elements of an array
- How should you decide when to terminate the iteration?
 - The iteration must always terminate after processing the last element in the array
 - If not, the program behaviour will be undefined

- Describe how you would decide when to stop iterating over
 - An array
 - If the size of the array is known, we can increment the pointer the appropriate number of times
 - If it is not known, we can calculate it:
 - Divide the memory used to store all the elements in the array by the memory used to store one element
 - The sizeof operator gives the amount of memory used by its argument

- Describe how you would decide when to stop iterating over
 - A C-style string
 - A C-style string has a null character (character with integer value 0) immediately after the last character in the string
 - When iterating through the string, we check if each character is equal to null before processing it
 - If it is, we have reached the end of the string and we stop iterating