Python: Independent Challenges

1. Using pseudocode, write an algorithm to carry out a linear search on an array of data. Extend the algorithm so once the item is found its indexed position in the list is returned. Write the program in Python and test that it works array containing integers, an array containing strings and an array containing float numbers.

2. Using pseudocode, write an algorithm to carry out a binary search on an array of data. Extend the algorithm so once the item is found its indexed position in the list is returned. Write the program in Python and test that it works on an array containing integers and an array containing strings.

3. “We Drive Anywhere” is a taxi firm who have the following criteria when working out the customer charge. Between 8am and 8pm the following rules apply:

* £3 for the first mile and £2 for every additional mile
* If there are more than 4 passengers there is a charge of £2 for each extra passenger.

Between 8pm and 8am the overall charge is doubled. Design an algorithm that will allow the taxi drivers to input the required information and will then output the total charge. Create the program in Python and test it for different scenarios.

4. Write an algorithm for a pupil maths quiz that will test their knowledge of addition, subtraction, multiplication and division facts. The quiz should ask 10 questions and allow the students to input the answers. They should be given feedback on whether each question is correct or not and a total score should be calculated. Write the program in Python and test it.

5. Write an algorithm that will store the names of 5 shop products in an array and 5 product prices in a separate array. The algorithm should allow the user to input their choice of product name and then return the name of the product and its corresponding price. You could extend the algorithm by allowing the user to purchase more than one item and then use a calculation to work out the total cost of their bill. You could then output a ‘receipt. Write the program in Python and test that it works without any errors.