Name: Class:

Task 1

1. The names shown below are held in an ordered list.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Alan | Bob | Carl | Dave | Ed | Fred | Geri | Hal | Jo | Ken | Lara | Mo | Ned | Pam |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |

(a) A binary search is carried out to find the name Ed. Which names will be examined?

(b) A binary search is made to find the name Jo. Which names will be examined?

(c) Will it take more than 3 tries to find any name? If so, which name(s)? How many names have to be examined?

2. Using the binary search algorithm, you should be able to guess a number between 1 and 2n in n+1 guesses.

(a) What is the maximum number of guesses it will take to find a number between   
1 and 64?

(b) What is the maximum number of guesses it will take to find a number between 1 and 1000? Explain your answer.

Task 2

1. (a) On average, how many guesses would you need to find a number between 1 and 1000 if you performed a linear search – i.e., guess 1, 2, 3 etc until you find the number?

(b) What does this tell you about the efficiency of the binary search algorithm?

2. Under what circumstances is it **not** possible to carry out a binary search?