Review: Vocabulary and Binary Search

1. Write the correct vocabulary word next to the box that best describes it. **(4)**

abstraction	*algorithm*	*constant*	*construct*	*decompose*	*flowchart*	*pseudocode*	*variable*

a)	***decompose***	breaking down a complex problem into smaller, more manageable parts
b)	***constant***	a memory location that stores an unchangeable value
c)	***variable***	a memory location to store a value that may change while the program is running
d)	***algorithm***	a precise method for solving a problem
e)	***construct***	a smaller part used as a building block
f)	***pseudocode***	a structured, code-like, high-level description of an algorithm
g)	***flowchart***	a diagrammatic representation of an algorithm
h)	***abstraction***	hiding complexity by focusing on the essential features of a problem

2. The teacher has a sorted list of names from a class, as shown below. For each stage, write "`s`" for the start index, "`m`" for the middle index, and "`e`" for the end index in order to identify the stages of a ***binary search*** to find the name "Jackson" in the list. In order to calculate the middle index, use: `(start+end) DIV 2`. The indices of the array are written above the first stage to help you. (Page 30, question 6) **(7)**

	0	1	2	3	4	5	6	7	8	9
	Azikewe	Bloom	Byrne	Davidson	Gateri	Hinton	Jackson	Linton	Smith	Wall
a)	*s*				*m*					*e*
	Azikewe	Bloom	Byrne	Davidson	Gateri	Hinton	Jackson	Linton	Smith	Wall
b)						*s*		*m*		*e*
	Azikewe	Bloom	Byrne	Davidson	Gateri	Hinton	Jackson	Linton	Smith	Wall
c)						*s, m*	*e*			
	Azikewe	Bloom	Byrne	Davidson	Gateri	Hinton	Jackson	Linton	Smith	Wall
d)							*s, m, e*			

e) How many times did the algorithm need to compare two names before it was able to find the name "Jackson"?

4

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0	1	2	3	4	5	6	7	8	9
Azikewe	Bloom	Byrne	Davidson	Gateri	Hinton	Jackson	Linton	Smith	Wall
s				***m***					*e*

Azikewe	Bloom	Byrne	Davidson	Gateri	Hinton	Jackson	Linton	Smith	Wall
					s		***m***		*e*

f) How many times would the algorithm need to compare two names in order to find the name “Linton”?

2

0	1	2	3	4	5	6	7	8	9
Azikewe	Bloom	Byrne	Davidson	Gateri	Hinton	Jackson	Linton	Smith	Wall
s				***m***					*e*

Azikewe	Bloom	Byrne	Davidson	Gateri	Hinton	Jackson	Linton	Smith	Wall
					s		***m***		*e*

Azikewe	Bloom	Byrne	Davidson	Gateri	Hinton	Jackson	Linton	Smith	Wall
					s, ***m***	*e*			

Azikewe	Bloom	Byrne	Davidson	Gateri	Hinton	Jackson	Linton	Smith	Wall
						s, ***m***, *e*			

Azikewe	Bloom	Byrne	Davidson	Gateri	Hinton	Jackson	Linton	Smith	Wall
						e	*s*		

g) How many time would the algorithm need to compare two names before exiting if the list was searched for the name “Johnson”?

4

0	1	2	3	4	5	6	7	8	9
Azikewe	Bloom	Byrne	Davidson	Gateri	Hinton	Jackson	Linton	Smith	Wall
s				***m***					*e*

Azikewe	Bloom	Byrne	Davidson	Gateri	Hinton	Jackson	Linton	Smith	Wall
					s		***m***		*e*

Azikewe	Bloom	Byrne	Davidson	Gateri	Hinton	Jackson	Linton	Smith	Wall
								s, ***m***	*e*

Azikewe	Bloom	Byrne	Davidson	Gateri	Hinton	Jackson	Linton	Smith	Wall
							e	*s*	

h) How many time would the algorithm need to compare two names before exiting if the list was searched for the name “Nielsen”? *Hint:* the answer is not the same as part (g).

3