CSP2204 Data Structures

Review Questions 03

Topic: Array Algorithm Analysis

1. The elements of an array are related by the fact that they have the same `name` and `type`.

2. The process of placing the elements of an array in order is called `sorting` the array.

3. Determining if an array contains a certain value is called `searching` the array.

4. True or False: An array index should normally be of data type **float**. `False`

5. Consider the array data set below. Use binary search to work out (step-by-step) the search process for values 123 and 76, respectively.

Search for 123 in a[0..7]

14	43	76	100	115	290	400	511
a[0]	a[1]	a[2]	a[3]	a[4]	a[5]	a[6]	a[7]

middle=(0+7)/2=3; (a[3]=100)<123; so, search for 123 in a[(middle+1=4)..7]

115	290	400	511
a[4]	a[5]	a[6]	a[7]

middle=(4+7)/2=5; (a[5]=290)>123; so, search for 123 in a[4..(4=middle-1)]

115
a[4]

middle=(4+4)/2=4; (a[4]=115)!=123; so, 123 not in a[ ]

Search for 76 in a[0..7]

14	43	76	100	115	290	400	511
a[0]	a[1]	a[2]	a[3]	a[4]	a[5]	a[6]	a[7]

middle=(0+7)/2=3; (a[3]=100)>76; so, search for 76 in a[0..(2=middle-1)]

14	43	76
a[0]	a[1]	a[2]

middle=(0+2)/2=1; (a[1]=43)<76; so, search for 76 in a[(middle+1=2)..2]

76
a[2]

middle=(2+2)/2=2; (a[2]=76)==76; so, 76 in a[2]