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SECTION A: ALGORITHMS REPRESENTATION

FULL DECLARATION FOR ALL THE CODE

```
Contact phonebook[] = new Contact[size];
name as string;
searchTerm as string;
newName as string;
newPhoneNumber as string;
contact as object;
newContact as object;
i as integer;
n as integer;
temp as object;
```

1. INSERT CONTACT

This function will insert a new contact into the phonebook.

```
Function InsertContact(phonebook, name, phoneNumber)
    Create new contact object with properties name and phoneNumber
    Append new contact object to phonebook array
    Return "Contact added successfully"
End Function
```

2. SEARCH CONTACT

This function will search for a contact by name or phone number.

```
Function SearchContact(phonebook, searchTerm)
    For each contact in phonebook
        If contact.name == searchTerm OR contact.phoneNumber == searchTerm
    Then
        Return contact
```

```

        End If
    End For
    Return "Contact not found"
End Function

```

3. DISPLAY ALL CONTACTS

This function will display all contacts in the phonebook.

```

Function DisplayAllContacts(phonebook)
    If phonebook is empty Then
        Return "No contacts available"
    End If
    For each contact in phonebook
        Print contact.name, contact.phoneNumber
    End For
End Function

```

4. DELETE CONTACT

This function will delete a contact by name or phone number.

```

Function DeleteContact(phonebook, searchTerm)
    For i from 0 to phonebook.length - 1
        If phonebook[i].name == searchTerm OR phonebook[i].phoneNumber ==
searchTerm Then
            Remove phonebook[i] from phonebook
            Return "Contact deleted successfully"
        End If
    End For
    Return "Contact not found"
End Function

```

5. UPDATE CONTACT

This function will update the details of an existing contact.

```

Function UpdateContact(phonebook, searchTerm, newName, newPhoneNumber)
    For each contact in phonebook
        If contact.name == searchTerm OR contact.phoneNumber == searchTerm
Then
            contact.name = newName
            contact.phoneNumber = newPhoneNumber
            Return "Contact updated successfully"
        End If
    End For
    Return "Contact not found"
End Function

```

6. SORT CONTACTS (OPTIONAL)

This function will sort the contacts based on their names.

```
Function SortContacts(phonebook)
    Sort phonebook array by contact.name
    Return "Contacts sorted successfully"
End Function
```

7. ANALYZE THE EFFICIENCY OF THE SEARCH ALGORITHM

This function will analyze the search algorithm's efficiency in terms of time complexity.

```
Function AnalyzeSearchEfficiency(phonebook)
    Let n = phonebook.length
    If n == 0 Then
        Return "Efficiency: O(1) (best case, empty phonebook)"
    Else
        Return "Efficiency: O(n) (worst case, need to check every contact)"
    End If
End Function
```