

1. What is the "big O" notation of this algorithm?

```
void printAllNumbersThenAllPairSums(int arr[], int size)
{
    for (int i = 0; i < size; i++)
    {
        printf("%d\n", arr[i]);
    }

    for (int i = 0; i < size; i++)
    {
        for (int j = 0; j < size; j++)
        {
            printf("%d\n", arr[i] + arr[j]);
        }
    }
}
```

- ☐ O(n)
- ☐ O(n + n²)
- ☒ O(n²)
- ☐ O(1)

2. What do you think this algorithm is doing?

```
public boolean doSomething(String s) {
    if(s==null){
        return false;
    }

    s = s.toLowerCase();

    int i=0;
    int j=s.length()-1;

    while(i<j){
        while(i<j && !((s.charAt(i)>='a' && s.charAt(i)<='z')
            || (s.charAt(i)>='0'&&s.charAt(i)<='9'))){
            i++;
        }

        while(i<j && !((s.charAt(j)>='a' && s.charAt(j)<='z')
            || (s.charAt(j)>='0'&&s.charAt(j)<='9')))){
            j--;
        }

        if(s.charAt(i) != s.charAt(j)){
            return false;
        }

        i++;
        j--;
    }

    return true;
}
```

- ☐ Controls the takeoff and landing of drones
- ☐ Reverses a string
- ☒ Identifies palindromes
- ☐ Shift/Caesar cypher

3. Your application has a set of server connection strings stored in its configuration file each with a name & value.
At runtime, the system needs to find the connection string values by the name.

What data structure would you use to store the connection strings when your application is loaded?

- ☒ Dictionary
- ☐ List
- ☐ Hashset
- ☐ Array

4. You need to create a web page with a header, footer, content area and sidebar.

Which modern layout approach would be appropriate to use?

- ☐ Flexbox
- ☐ HTML tables
- ☐ XSLT
- ☐ Floats

5. What is meant by a responsive design?

- ☐ A website design mockup that allows you to simulate clicks & navigating a web site
- ☐ A highly performant codebase design
- ☐ A web page that displays well on any device or screen size
- ☐ A web page that can be used with a screen reader

6. You need to make a web page with an element the user can click to open a dialog. What HTML element would you base it on?

- ☐
- ☐ <div>
- ☐ <button>
- ☐ <a>

7. Is this a valid SQL query?

```
SELECT ID, FirstName, COUNT(ID)
FROM Users
GROUP BY LastName
```

- ☐ Yes, it's valid
- ☐ No, it's invalid

8. Which of these queries will return the set of user IDs which have made no transactions?

Query 1:

```
SELECT Users.UserId
FROM Users
JOIN UserTransactions
    ON Users.UserId = UserTransactions.UserId
GROUP BY Users.UserId
HAVING COUNT(*) = 0
```

Query 2:

```
SELECT Users.UserId
FROM Users
LEFT JOIN UserTransactions
    ON Users.UserId = UserTransactions.UserId
GROUP BY Users.UserId
```

Query 3:

```
SELECT Users.UserId
FROM Users
LEFT JOIN UserTransactions
    ON Users.UserId = UserTransactions.UserId
WHERE UserTransactions.UserId IS NULL
GROUP BY Users.UserId
```

Query 4:

```
SELECT Users.UserId
FROM Users
RIGHT JOIN UserTransactions
    ON Users.UserId = UserTransactions.UserId
GROUP BY Users.UserId
```

- ☐ Query 1
- ☐ Query 2
- ☐ Query 3
- ☐ Query 4

9. Your application has some code that does something similar to this:

```
var q = "SELECT * FROM users WHERE name='" + u + "' AND password='" + p + "'";
```

You've been asked by your senior engineer to fix it immediately!

Why do you think that would be the case?

- ☐ The code uses terrible variable names
- ☐ The code is a security vulnerability
- ☐ The SQL query code is invalid
- ☐ The code is very poorly formatted

10. You receive an email that looks like it comes from the Quantum CEO asking you to quickly buy a gift card for a customer. He's in a hurry and its a secret mission. Should you:

- ☐ Ignore it - they are the CEO and have other people who can do stuff for them if its that urgently
- ☐ Tell your manager about the email to confirm what's being asked of you before taking any action
- ☐ Just do it - they are the CEO and know what they need
- ☐ Reply to the email asking for confirmation

11. Tell us why you'd be a great software engineering team member at Quantum?