

## Notes :

1. Before adding a question / category / software house, make sure your question / category / software house does NOT already exist. **Use the outline on the left to see if a company already exists.**
2. Add question / category / software house according to the format (numbers etc)
3. It's your own thing. Its quality will be only as good as you would want it to be!
4. Formatting tip: use <TAB> and <SHIFT>+<TAB> to change bullet point levels for category and questions
5. Here is the sample format:

## Company Name

- **Category 1**
  - Question 1
  - Question 2
  - Question 3
- **Category 2**
  - Question 1
  - Question 2
  - Question 3

# System Ltd

- Fyp & personal
  - How do you define yourself ?
  - Why does empathy matter to you a lot ?
  - Questions about the things you have mentioned on the cv and the form you filled on test day
  - What was your role in the fyp ?
  - Do you think there should have been a leader in fyp ?
  - What are the things that inspire you ?
  - What do you know about systems ?
- Technical
  - What would go wrong if everything is on cloud ? specially cars ?

# Techlogix

- Programming
  - Write a function that takes a char string like "1234" or "-1234" and returns int
  - Given are three numbers x, y and z such that  $x = y^z$ . Write a function to compute x. Find its time complexity. Can you optimize it?
  - Given a singly linked list, print values from nth to last element of the list.
  - Swap 2 integers a and b without using another variable
  - Given 2 arrays A and B, give all the pairs in A and B (e.g. A[i], B[j]) that give a sum of k. (Note: there is a solution with  $O(n \log n)$  and also with  $O(n)$  by using hashing)
  - Given a function that generates a random number between 20-50, write a function that generates a random number between 10-70. (scale approach)
  - Write a program to print the maximum numbers from an array of size n in windows of size x sliding across. For example, if [1 6 5 1 3 7 8] and x = 3, then output [6 6 5 7 8].
  - Write a function to check if a string is palindrome or not.
- OOAD:
  - What is the difference between using Interfaces and inheriting Classes (in Java)
  - Why use OOAD opposed to sequential and functional.
  - List and describe some OOP design patterns.
- SQL
  - Write a query to find list the employee name, manager name and dept name (from very generic tables)
  - What is Normalization and why do we use it (*follow up: Why remove redundancy?*)
  - What are aggregate functions
- Analytical:
  - An airplane flies from Islamabad to Karachi in 90 mins but flies back from Karachi to Islamabad in 1 hour 30 minutes. Why?
  - There's a room with dimensions X \* Y. You're given tiles of N\*N. Maximize N such that the tiles completely cover the room.
  - The longest distance you can travel when you have 3 motor bike tires that wear out after 30 km ?
- Generic
  - Explain what is your FYP
  - Tell me about yourself
- Technical (Implementation or Business analyst )
  - What are the advantages of normal forms to customer and to engineer
  - Which one is faster, normalized or single table for data extraction
  - What is the difference between truncate drop and delete

- Why is there need for views alongside table ?
- Second in-office Interview:
  - What are you doing these days?
  - Talk about the projects you mentioned (for the above question)
  - Talk about your FYP. What are its applications? How do you judge its importance?
  - Which programming language do you prefer? Why?
  - Can foreign keys be null?
  - What is an index? Why do we use it?
  - How to deal with views if there is a change in original tables?
  - What is performance wise better join or a subquery?
  - In which case accessing data will be fast, a sorted array or a hashmap?
  - Without using any built-in functions, how would you tell if a number is a power of 2?
  - When do you use recursion over iteration?
  - Without using any built-in functions, how would you calculate square root of a number?
  - Do you watch any movies? If so, which kind?
  - What are your strengths? What are your weaknesses?
  - Name any design patterns. How have you used the ones you named in your projects?
  - Did you do any internship in the summers?

## Xavor

- HR:
  - Salary?
  - Are you currently interviewing for any other jobs
  - Have you ever been a lead in a team?
  - Strengths and weaknesses?
  - How are you overcoming your weaknesses?
  - Any idea what Xavor does?
  - Interests?
  - Ideal organization?
  - Did you know about Xavor before the recruitment drive?
  - Freelancing experience?
  - Is the expected salary negotiable?
  - What would you bring to Xavor?
  - What are your future goals?
  - If you want to spend 100,000 pkr in charity, where will you spend?
  - What is dean's list?
- Technical:
  - Describe yourself (First question of the Technical interview)
  - FYP
  - Other than FYP, which project gave you the most satisfaction?
  - Any other projects
  - How do you deal with a problem that you just can't solve
  - How would you deal with a teammate who isn't completing their work on time?
  - What is Interoperability in Asp.net?
- Analytical / Programming:
  - A building has 100 floors. You have 2 similar mobiles. How would you find the maximum floor from which dropping the phone would not break it? (Optimize time and you can waste both phones)
  - You have two ropes. They each take one hour to burn. How would you know when 45 minutes have passed? They don't burn sequentially, i.e., you can't keep track of how much of the rope has burnt (10%, 25%,...)
  - Write a program to find the first non-repeating letter in a string. For example, "abbcdaa" then "c" is the first non-repeating letter. Can you go better than  $O(n^2)$ ? You cannot use additional data structures (including an array, which until the interviewer pointed out, I

had totally forgotten is also a data structure). The only string functions you can use are indexing (`s[i]`) and `s.length()`

- You have a balance and eight balls which are of same size and have exactly same appearance. 1 out of eight balls has more weight than rest of the seven individual balls. You have to find the ball which weighs more by using balance as minimum times as possible.
- SQL / DB:
  - A query is taking a very long time to execute, how will you debug and what might be the problems.
  - What are Database Indexes? Clustered Index, etc
  - What are Stored Procedures?
  - What are User Defined Functions?
  - Why do we use Having?
  - What are the different types of JOINS?
  - Write a query to get the count of a value that is repeated the maximum times
  - What are composite keys?
  - Difference b/w primary key, composite keys and unique attributes
  - What is indexing?
  - Which of noSQL and relational database is faster?
  - Write a query to calculate cgpa of a student.
  - Write a query to get the 10th highest salary.
- Java:
  - Interface vs Abstract Classes
  - What is static class
  - Why use interface, why not just abstract classes
  - A universal remote is used to turn devices (AC, TV, etc) on and off. How will you describe this functionality in code? Does a design pattern apply?
  - Given a directory tree, code a function get all the files in that File System. What will the code be if BFS is used? What if DFS is used?
  - What is a static class?
  - Is it necessary for a static class to have static data members and static functions?
  - What if I write a public static abstract class?
  - If children do not overwrite the functions of the parent class (abstract), do functions occupy the same memory locations for multiple children?
  - What is meant by function overriding ? Why do we do it?
- Software engineering:
  - Familiar with github?
  - Github commands

- What is a sprint
- What is continuous integration
- OOAD:
  - What is Polymorphism?
  - What advantage is there to using polymorphism?
  - What is Singleton?
  - What is Data Encapsulation? Give a real world example
  - Why use classes instead of modular programming?
  - Can you do polymorphism in a single class?
  - Describe polymorphism in terms of objects in the interview room.
  - What Architecture design is high in Cohesion. (Answer: Service oriented Architecture)
- Python:
  - Is python an object oriented programming language?
- General:
  - What is life? (not kidding)
  - Give a logical proof that if two consecutive numbers have a difference of two (eg 17 and 19), the number in the middle (eg 18) is a multiple of 6.

# HumBike

- Android:
  - Any point of starting a new thread in a resource demanding service?
  - What's a sticky intent?
  - What is intent service
  - Difference between Async Task and Service
  - Would you prefer AsyncTask over Java Thread. Why?
- Programming:
  - Given a graph with N nodes, find the shortest line that connects A, B and C.
- HR:
  - Any criminal history?



# VentureDive

- General:
  - Describe yourself
  - Describe your FYP
  - Why VentureDive?
  - How much did you prepare for this interview?
  - What do you prefer? C++, Java, Android?
- Programming:
  - Swap two integers without having a temporary variable ?
  - Find duplicates in an array without using HashMaps in  $O(N)$  ?
  - Different version of a function overriding, with either different return type or with different parameters. Does this qualify as function overriding as well ?
  - Difference between overriding a simple function and overriding a virtual function?
  - What will happen if I try to change Java bytecode through a Java program?
  - Difference between overloading and overriding
  - Draw a UML diagram of a project ( they gave me one of my university projects)
  - How to find if a linked-list has a cycle?
  - Write pseudocode to implement a stack.
  - Suppose a C++ class has a virtual function, can we create its object?
  - What are friend functions or classes? If class C is inheriting from class B and class A is a friend of class B, can class C also access class A?
  - What happens if data is increased in case of recursion? (Ans: space complexity issue i.e. stack overflow)
  - How the compiler gets to know which function to execute in case of overriding? (Hint: Vtable)
  - Why can't we instantiate objects of abstract classes? (Ans: no entry of virtual functions in Vtable)
  - Wrote 3 structs and asked about the size of each in memory. (Hint: space less than 1 word size cannot be allocated in memory)
  - Given a string of n length. Write code to generate all permutations of that string
  - Write recursive code to traverse bst in order.
  - How are AVL rotations performed?
- Android / Java:
  - Write the code for an activity.

- What are memory leaks in Android?
- How can we avoid memory leak?
- How many threads are there in Android?
- Why use Fragments instead of Activities?
- What if a fragment gets destroyed?
- How are threads created?
- Is it guaranteed that a thread will start considering I write the code and run it? Suppose I have 10K threads and I start another. Is it guaranteed to start?
- I have two threads arriving at the same time, how do I select one that should always run first?
- Why do we use threads?
- What can go wrong if I have a network call in a thread that updates the UI after receiving the data? What can I do to solve this?
- What is Hibernate?
  
- OOAD:
  - Implement polymorphism without having inheritance?
  - Diff b/w Polymorphism and Inheritance?
  - Diff b/w Data Encapsulation and Data Abstraction?
  - How can we do Data Encapsulation?
  - How can we do Data Abstraction?
  - Does it is necessary that a class having Abstraction will have encapsulation ?
  - What is Factory pattern?
  - What is State pattern?
  - What is coupling and cohesion?
  - Which is better, coupling or cohesion? Why?
  - Why do we use Design Patterns? What are the benefits?
  
- Database:
  - What is Indexing? If the table has only primary keys does it need to store index or cluster index ?
  - Draw the schema for an Airline Management System (Selected from the course projects)
    - Using the drawn schema. Write a query to view the information of passengers that have bought the ticket for a flight that is going from JFK to ISB but has been cancelled and the passenger has not boarded yet. Also the airplane should be Airbus.
  - Write a query to get the student with second highest marks in a table.
  - What are transactions?

- Analytical:
  - You have two ropes. They burn in 30 minutes each. I want to know when 45 minutes pass.
  - You have 8 balls. 7 of them are 8g each. One ball is 10g. You have a manual balance (scale). How would you efficiently find the heavier ball?
  - There is an elephant that needs to go 1000 km across, it can only carry 1000 items at one time. You have total 3000 Items how much will you be able to transport if elephant consumes 1 item on 1 km.

## IMSI

- General:
  - Can you give us 20 hours per week right now?
  - Which language would you prefer working in?

## Arbisoft

- HR (after 12 hour test)
  - What was the best thing about today's test
  - Do you plan to go abroad
  - If we hire you, will you stick around for 2-3 years?

## i2c

- General
  - Would you be comfortable working at night?
- HR Questions:
  - Your 3 weaknesses and strengths?
  - Expected Salary?
  - Are you OK with what we do.
  - What are your hobbies and stuff
  - Tell us something about yourself
  - Introduce yourself. Tell us about your educational and professional background (if any).
  - What is the perception of i2c among fastians.
  - What differentiates you from other candidates?
  - Biggest accomplishment?
  - Role in FYP?
  - Difference between smart work and hard work (what do you prefer? explain?)
  - Any kind of negative remarks about this company?
  - What makes you frustrated?
  - Did you participate in any co-curricular activity?
  - What are your passions?
  - You might get other job offers, so what would be the reasons to choose i2c over other companies?
  - Do you have any questions to ask from us?
  - Why is your CGPA low? (incase you have a low CGPA)
  - Do you have any plans for further studies?
  - You might also be asked something related to the essay you wrote in the HR assessment.
- Technical:
  - (Just basic CONCEPT of the following, not much detail.)
  - Basic intro of your FYP
  - What was your part in fyp
  - Basic intro of any other projects you have done
  - Tell some git commands
  - What is difference b/w encryption and compression
  - Tell some encryption algos
  - How would you encrypt any given string?
  - What is backlog
  - How long is a Sprint
  - DETAILED explanation of FYP

- Applications of FYP
- Name some non-functional requirements of your FYP (+ name some general non-functional requirements).
- Why do we use ftp protocol
- What is serialization and deserialization?
- Regex and How to use regex on a particular initial?
- Write recursive factorial function?
- Difference between array and vectors?
- What are collections?
- What is static and final?
- What is garbage collection? How would you implement it?
- What is CNN?
- How would you make an artificially intelligent machine?
- What are access specifiers?
- Which protocol should be used while making a chat system ?
- How can you create a heap overflow ?
- Database
  - Normal Forms.
  - Anomalies
  - DDL, DML
  - Views, Triggers
  - Write a query to delete a table
  - How will you create a table with images?
  - When do we use varchar
  - What is noSQL
  - What are transactions
  - What is rollback
  - How would you implement a rollback function if you are creating a DBMS?
  - What is SQL injection?
  - Truncate vs Delete vs DROP
  - Write a query to select average salary department wise
  - Delete a row
  - How are views helpful/Advantage of views in business layer?
  - Why is TRUNCATE a DDL?
  - How to use a BLOB?
  - What is ACID?
  - What is projection?
  - How to delete a column from a table?

```
SUBJECT
subject_id    subject_name
```

```
STUDENT
student_id    student_name    subject_id    student_marks
```

```
Resultant table
Student_name    student_marks    subject_name
```

Write a query to display only the students with the highest marks for each course in the Resultant table

- O.S:
  - Type of File Systems (just names)
  - components of List operating systems
  - List data structures used in OS.
  - Where is a heap used in OS.
  - How does a file system run/work
  - What are some commands of assembly language?
  - What is fragmentation?
  - List some terminal commands
- C.N:
  - What are ports?
  - List network protocol
  - Which protocol would you use if you wanted to create Twitter? (ans: HTTP, not TCP)
  - How to prevent a DDos attack ?
- C.A:
  - Fragmentation.
  - Virtual Memory
  - What data structure would you use to implement Main Memory?
  - Caches are different from Main Memory, so what data structure would you use to implement a cache?
- OOP:
  - Static Variable
  - Singleton Class
  - What is open/closed principle
  - What is cohesion
  - What is single responsibility principle
  - Composition vs inheritance



- What is coupling?
- How can you increase coupling? How would you increase coupling in a SINGLE class?
- Is coupling high in composition?
- How can you reduce coupling?
- What are immutable strings in Java.
- Data Structures:
  - Basic definition of stack and queue.
  - Name some searching algorithms.
  - Explain a code to delete second last element of a linked list
  - What is the difference between a set and a list/array?
- Java:
  - What is the role of jdbc/odbc?
  - What is the difference between immutable and mutable strings? (Strings are always immutable!)
  - How can you make a String mutable?
  - Null pointer exception
  - What are packages in Java?
  - What is final in java why we make a final method ?
- Software Testing:
  - Describe the types of ST
  - What is unit testing
  - What is assert statements (in junit)
  - How did you perform white box and black box testing (if you have done it)
- Assembly:
  - What does shift left operation do mathematically? (Ans: multiplication by 2)
- Software Engineering:
  - What is SOLID Principle?

# Tintash

- Unity:
  - Difference b/w transform and translate
  - Fixed and simple update function
  - How the built in functions in script are called.
  - What is a Mesh ?
  - What is a collider ?
- DS:
  - Write a recursive function to reverse the nodes of the singular link list.
  - Delete nth element without using any counter from the link list ? Hint: use pointers and distance then according to number n
  - Find median of link list without using the counter ?
  - How to make stack with two queues.
  - Delete nth last element in strict  $O(n)$  ?
  - Delete the nth element without using the previous pointer? Ans: Copy the data from the next node to current node and delete the last node
  - Postfix Expression algorithm.
  - ZigZag Array problem
  - Reverse a linked list.
  - Divide a set into two subsets such that difference between the sum of numbers in two sets is minimal?
- OOAD:
  - Name different design patterns and explain them.
  - Implement polymorphism
  - Implement Singleton Pattern
  - Implement class diagram of Composite pattern
  - Implement MVC
  - Rest APIs
  - Polymorphism, Abstract class and he make changes to code having polymorphism and abstraction concept and ask me to find whether code will give error or not.
  - Abstraction vs Encapsulation
  - Ask basic major concepts of ooad.
  - What are the advantages of object-oriented over functional programming?
  - Database Schema design and queries on group by, order by, join and having clause.
- Analytical
  - A beast takes away your half of your food item and return you 1. How much do you require to have 2 items at end after meeting beast for 5 times.

- Same beast take away half of the items now and return nothing. Give a generic formula to this ? For nth encounter
- Top horse among 25 horses problem
- 8 balls weight problem
- Two people dropped on a plane. A doesn't know where B is and B doesn't know where A is. They can move left or right only. How can A find B? Hint: Move left 1 step then move right 2 steps then left 3 steps then right 4 steps until B who is standing still is found.

## Frag-Games

- C++:

- What are the issues with lines 17 and 19?

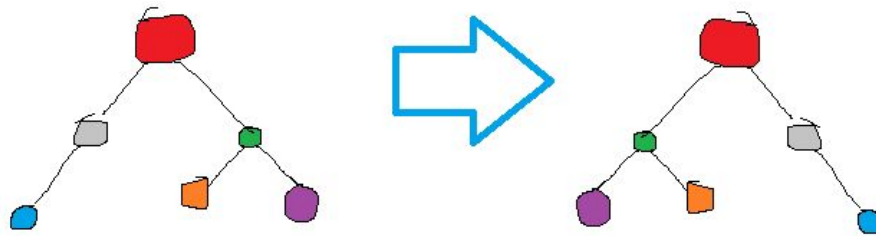
```

1  int* foo()
2  {
3      int a = 10;
4      return &a;
5  }
6
7
8  class Yolo
9  {
10 private:
11     static int a = 10;
12 };
13
14 int main()
15 {
16     int *test = foo();
17     cout << *test;
18
19     cout << Yolo::a;
20 }

```

- Class B inherits from A. How will the stack look like with regards to A and B if you make an object of B?
- When can you call static functions in a class?
- Lifetime of static variable in a class?
- What is scope resolution (or maybe it was access resolution idk)
- Why is it better to have static variables in a class instead of global variables?
- Write a function to see if two binary trees are mirror of each other

- Write another function to mirror a given tree:



- Make a stack that can be flipped in  $O(1)$ , ie if it would currently give A B C, it should give C B A after flipping
- Identify diamond problem and give solution
- OOAD:
  - You have 4 enemy types, they all have some health stamina etc. They also have two attacks, full and half power (so functions). This attack varies from enemy to enemy. Make class diagram
- Analytical:
  - There are two rope bridges spanning a river. 4 people need to cross it. The 4 people cross the river in 1, 3, 7, 10 mins. Only one person can be on a bridge at any given time. Minimum time to cross?

# TkXel

- OOAD
  - What is OOAD and why do we need it?
  - 
  - What is polymorphism?
  - What is the difference between Function overloading and overriding?
  - What is the keyword static? (In all contexts)
  - When are static members initialized?
- DS/Algorithms
  - What's your favorite data structure?
  - Name the types of sorting algorithms?
  - What's the most efficient sorting algorithm you know?
  - What is merge sort? What is its time complexity?
- DB
  - Design a database that represents the management hierarchy at the company.
  - Write a query to get the name of an employee and the name of his direct supervisor from the previously created DB.
  - What are joins? (All kinds)
- OS
  - What is paging?
  - What are semaphores and mutex locks? Differentiate between them.
  - What are race conditions.
  - List some scheduling algorithms.
- Analytical
  - You're given 1 3L jug and 5L jug, how will you get 4L of water from pond using the 2?
  - What day of the week will it be 100 days from now? (Write a general formula)
- 
- Programming
  - Differentiate between shallow and deep copy.
  - What happens when an object is created? (Behind the scenes, i.e constructor is called, memory allocation etc)
- Other

- Explain your FYP
- Introduce yourself (this was the first question in the interview :p)
- What languages are you comfortable working with? (Specifically asked about Java)

## UWorx

- Technical:
  - How would you go about creating a clone of facebook? (ie design)
    - This question had several follow-up questions to guide/test you in the design phase. This part will vary for everyone.
  - How would you add a “like” feature? How would the poster be notified of likes?
    - This question also had several follow-up questions to guide/test you in the design phase. This part will vary for everyone.
    - Eventually extended to queries about server-side implementations, how you would handle load, and support a growing number of users.
  - What is immutable object
  - What is MVC
  - Explain your FYP
- HR:
  - Expected salary
  - How many siblings and what do they do?
  - Strengths and weaknesses?
  - What do you know about the company? (Uworx is a company that specializes in making retail software for companies like Mark & Spencer. The team is split into the Pakistani half and the UK half, and they work together rather than the Pakistani side being just an offshore resource) (<---what they told me)
- CEO Skype interview:
  - What does UWorx do? (same answer as above)
  - How would a friend of yours describe you?
  - How would a teacher of yours describe you?
  - If you were an animal, what would you be? (like WTH, man)
  - Which part of your FYP did you like the least/disliked the most and why?
  - How did you resolve conflicts in your FYP?
  - Describe a failure in your life and tell how you overcame it.
  - Which of your FYP members is your best friend? (like WTH, man)
  - Which book would you recommend that every freshman should read?
  - Who was your inspiration for choosing CS?
  - What factors did you consider before choosing CS?

- Tip: if you and your FYP member(s) are appearing for the interview, make sure all of you are on the same page. Any contradiction will be easily caught.



## SSI

- Management Interview (just a couple of senior executives asking you some basic questions)
  - Tell us about your education.
  - Tell us about your FYP
  - Between iOS and Android, which one has the dominant market share?
  - Do you see Microsoft's mobile platform (The windows phone) catching up with the others?
  - Explain the term "Internet of Things"
  - How many tennis balls can you fit in this room?
  - Do you have any non CS related hobbies?
  - Why are manhole covers round?
  - Some general knowledge question like, who is vice chancellor of germany.
  - What are you interested in? (in the context of CS e.g: Android development etc)
  - Why are you interested in the above mentioned field?

## Caramel Tech Studios

- Why does the prototype of a copy constructor contain an &?
- Can you pass by value in Java?
- Can you pass a primitive data type by reference in Java?
- A bin has 12 red balls, 10 blue balls, and 8 green balls.
  - How many balls do you need to pick so you're certain you have two of each color?
  - How many balls do you need to pick so you're certain you have two of any color?
- Given a number, write a function to reverse it (so 12345 -> 54321)
- Write a generic method to map 2d array indices to a linear memory offset. For example, given an array of dimensions 2x3 and index [1,1], return 4.
- Write recursive function for power of a variable  $x^y$
- Can you call static variables from a non-static member function? What about the other way around?
- Let's say there's a formula to get elements of a 1d array i.e.  $arr(i) = x + 2i$ . It means if you enter  $arr(1)$ , it will return  $x + 2*1 = x+2$  and give you  $arr[1]$  of an array. Now create a formula for doing this for 2D array.

### Questions for SQA

- What is smoke testing? Identify initial two smoke cases of a lift?
- What are usecases and testcases? Give one example of a usecase and identify its testcases.
- What are components of a test case?
- What are bugs? What are errors?
- Some bug scenarios were given to identify the bug severity and priority as high, medium or low.

### Analytical Questions

- You are present in a basement that has three electric buttons for three bulbs present on ground floor. For all three electric buttons you have to identify which electric button is associated to which bulb by only going to the ground floor once. (Hint: Concept of Energy/Heat)

# RedMath

## FYP:

- Describe your fyp in detail.
- What was your role in fyp?
- Technologies used?
- How many members?

## Web Programming:

- What are web services?
- SOAP vs RestFul
- What is WSDL?
- Have you ever made a web service? How?
- Have you made a project involving any website?
- Which framework did you use?
- Which language you worked on?
- Explain MVC. Any framework used for MVC?
- What is Sql injection and how to prevent it?

## Testing:

- What is unit testing?
- Write a code for unit test.

## OOAD:

- How many design patterns do you know? Name them
- Write code for any design pattern you have worked on.
- Inheritance vs Polymorphism
- Ever heard about mutable classes.
- Know anything about angular js or node js. Ever worked with them?

## Software Engineering:

- Agile development
- What is scrum?
- Any sdlc used in you fyp?

## General:

- Give a brief introduction about yourself.

- Describe other projects you worked on written in your CV.
- In which programming languages have you worked on?
- They provide you with questions and you have to write pseudo codes and sql queries
- What are your future plans?
- If you answer any question with a terminology, they are going to ask about it. You need to know everything about what you are saying.