Taped Interview of Dr. Salamah

Conducted by Dr. Gates and Software Engineering Students

February 21, 2013

**Dr. Salamah**

Welcome you currently have document that Dr. Gates and her guidance team is currently handing out to you. Introduce the idea of patterns and scope. So Today my goal is just for 5 to 10 minutes to go over what this means and then I guess we will open for questions.

**Dr. Gates**

So what we are going to do this time is I didn’t put together your question so we are going to go by each team and you are going to ask a question from your team that you feel is not answered.

**Dr. Salamah**

Alright so this idea of this pattern and scope combination is to help the scientist come up with properties that interest to them. There are many, many, many, properties that they can specify or care to specify. So using pattern scope helps them focus on what they want and actually triggers some questions that will enable them to come up with the best possible property that matches what their trying to understand. So in the first description that I have here is well multiple diagrams of what a scope is and a scope is just a function of the data in this case that you care about the property holding it. So you care about the whole data set you want that property to hold across the whole data set and that’s what a global scope comes in so you are saying I want that property I want temperature to never fall below zero over the whole set of data, so take that property over every single reading. That’s what the global scope is for that’s the simplest form. The next one is the before R scope. So before a specific event happens before something happens that’s the part of the scope that we care for. From the beginng up until that point the L condition that I am concern about holds. So you see here in this diagram I have in the before R I have the blue box is the scope of interest the part of the letters I care about the part where I am going to check my properties over. The rest of this I don’t care about the properties can fall or not fall I don’t care it is not my concern. Questions so far. Something about the before R is that the scope does not include the reading where R falls. So the scope is only for those readings or reading within that set precedes what R holds. What R holds is not part of the scope. Questions I am not sure you are getting this by the way you are looking at me, or is it too easy.

**Dr. Gates**

So if you are looking at before R and you are looking at near real time. So there are two ways that you can be monitoring right near real time and after the fact. We have a data reading from last year or week before and now you are going to ~~~ so before R can you do that check in near real time.

**Dr. Salamah**

Probably not. That has to be of a certain data. With the before R ~~ with the real time is about the patterns and less about the scope. Scope comes in when you are dealing with things you are limiting parts of the data that your looking at.

**Dr. Gates**

Global

**Dr. Salamah**

Global is an after L and after L and after L

**Dr. Gates**

**Dr. Salamah**

The next one probably the next one so the next scope is your set of interest set of data interest is the one that happen after the condition L happen. So lets say a condition L is the temperature reached 100 after that then look at all the data that comes after that. That's what my property is has to hold and that what we are talking about if that condition then that is applicable to this time. Once that condition happens then now I have to record any my properties are correlated and so on. Then comes the next two intresting scopes, the between L and R scope and the after L until R scope. For the first three scopes those are not defeating scopes meaning we have only one single scope for example for the before R I have only one before R scope. Even if there are conditions R such that R has happen many times I dont care I put and care about only the first occurance of R. Did you understand that? Okay so only the first occarance of R is the one I care about and my scope is on every data set, every reading that happen before that part. And the same thing for after L, and of course global scope is only one which is the whole data set. This is a little bit different for the between L and R scope. Between L and R scope is I care about the interval between the condtion L and the condition R thats my scope. But, this scope could repeat so every time L follows by R forms I add a new scope. Right, so if I had L is tempertures 50 R is temperture 100 if the conditions holds true after that then now I have another scope after that. And with these I can have misfits. This is why this is alittle bit hard. Because if first the last L is not with the first R , so you can see in the diagram that I have two scopes one with lite blue and one with dark blue. My dark blue is actually is called scope. From the first L until the last R includeing that big scope that is blue that light blue scope but I am checking within the two scopes I am checking the big one and I am checking also the small one. You are rarely gonna have this. What you will have is the situation that I was describing before. So you have an L followed by an R and then another after that anther L followed by an R. Thats more typical. Than having this scope. Questions so far?

**Dr. Gates**

Will that create a problem.

**Dr. Salamah**

The nested

**Dr. Gates**

Yeah, so if we want to have temperature that we would not have yesterday temperture equal to 100 and yet this reading is 103 be expecting on the right hand side temperture reaching 80.

**Dr. Salamah**

Right

**Dr. Gates**

We might not be able to nest it.

**Dr. Salamah**

Right and its not gonna be a bit its really not coming up with the spirit of this you are going to be checking the smallest scope which is the last L. And again this is not the typical type of scope that you will face. What I think that you will see more is the between L followed by condition R. That becomes your scope and then you start all over again at some latter form. Okay we good?

**Dr. Gates**

Did we talk about the open on the right

**Dr. Salamah**

Thats a good point, so remember when we say that the scope for the before R. So remind me the scope for the before R does it. What's speacial about it?

**Student**

Stops right before the R

**Dr. Salamah**

Stops right before the R good. So with the scope after L it includes the state R, its a mistake calling it state, the data reading where L holds. So its not the same, with the after L it does include the data reading where L holds. Where the before R does not include the data reading where R holds. And this is the same for between L and R. It includes the reading for L it doesn't include the reading for R. Yeah?

**Dr. Gates**

I was on the last open on the right

**Dr. Salamah**

Yeah, and if you see the definition. The definition also the textual definition not the diagram that specified as well. The after L until R is similar very similar to between L and R the only difference here is the R never holds that the scope is between the first L all the way until the end of the data. Or until you get an R or if you don't you just keep checking the R if you don't get an R until the very end of the data. Were good. Okay. Alright so lets move to patterns and for today we decide to just give you a subset of this and hopefully solicit some questions from you and then maybe we can come up with more examples. So we talked about scope is a range of intrest where I want my properties to hold. Where my properties specify by a factor. A factor is a certain time property which repeats over and over and over. So we are breaking these into time dependent and not time dependent. And today we giving you more examples of the not time dependent. So for example The universal the first example that we had. All for that scope now the scope can be whatever anyone of the five scopes we discuss before. Over that scope that set of data, data reading I want that universal factor to hold which means I want that property to hold over every reading in that scope. So if I have a global scope I want that reading universality property to be true over every reading in my data set. Okay. If I have a universality in between L and R then I don't care what happens before L, I don't care what happens after R. I only care that this property holds in every reading between the L until just before the R. That's what universality means. That property, for example lets say the temperture has to be smaller or equal to 35 that temperture has to be smaller or equall in every reading within the scope. So again if I am doing gobal scope, the temperature has to be 35 or less in every reading over all my set of data reading. Or if I am doing after L I don't care what happens before L but temperature better be 35 or less at the L until the end of the reading. Until the end of my data set. Easy, so far? Okay, Absence is a little bit the opposite. That property should never hold, in my scope. So we were saying universality if the truth holds in every reading. Absence it should never be hold in any of my readings. Again within the scope you're always gonna get by and existence it has to happen at some point it has to happen at least once. If it doesn't happen at least then it is an anomaly that is a violation and the interesting one is response. If you notice in all the ones before this one that the topic so far all the ones we have discuss so far we are trying to gain one type of reading like its either temperature, its either humidity, or something. We are doing one type of reading. WIth the response we have two scopes, because we have two data readings. I'm reading about temperature, I'm reading about humidity for example. And I am saying in response, if the temperature falls to 50 then the humidity must behave a certain way. That's why were saying we are performing or we are checking two data sets. The data set for temperature and the data set for humidity. Now somehow your job will be to calibrate those two data sets. To make sure that, that order is preserve. If the temperature happens at reading number 5 then the temperature becomes 50 at temperature number 5 then make sure the humidity becomes, I don't know 80%. At that same reading, reading number 5 within the humidity that is set or at reading number 6. It happens at that same reading or readings immediately after. Questions? Okay, I think this is my last act, my last scope.

**Dr. Gates**

Yeah, maybe in that handout there are several things that you will notice. One is that it tells you what the scope is, it tells you what the Boolean statement is, and the page there there is lets see what else does it tell you. I want you to look at absence. If you look at absence, its given me a positive right, its given me a Boolean relationship. But notice that absence is saying that is not hold. I am not putting the not there. I am just saying this is what should not hold.

**Dr. Salamah**

Right so we are not negating that property. We were saying is that the temperature should never be smaller or equal to 15. What Dr. Gates is saying is when you are specifying the Boolean here, the boolean does not say this is not smaller or equal to 15. That's something that has to be done in your implementation based on what the value that is selected.

**Dr. Gates**

What you are trying to figure out, how to get this information, or how does it help the scientist specifiy these properties. and there are alot of ways you can do it. You may use a pattern somehow to queue them or maybe question that you see, These are things we want you to think about. But we are at the point of saying what you need to do. The what not the how. So you should be thinking about what is it that you want the system to be able to gather. So we are trying to queue you and this maybe what you want or not want to do but you are gonna have to come up with some relationship right. And within that you'll see. We are going to give you other examples that are a little bit more complicated. It may be that you will have to do some math, some transformation with the variables that we should you. We are going to add another layer next week. We want to make sure we begin.

**Dr. Salamah**

One thing that I would like to lay out is. I was hoping that you would be asking this and maybe you were going to. When we say not time dependent, those are the type of properties that we are explaining today. Not time dependent and when you see the example, we are saying here at the daytime of May twelve, that well that’s time right, but that’s not the time we are talking about. Time dependent, we are talking within the property itself. So the property holds most of most of the times, a certain number of times. That’s the time dependency that we are talking about. Of course we didn’t give any of these example today, cause we did it with an on time dependent. But it doesn’t mean there is no time associated with the scope, because the scope has to be built with some sort of a time stamp over reading. So don’t let that confuse you. Not time dependent doesn’t mean that the property will not have any time in the textual description of it. Is that clear? Ok. Alright.

**Dr. Gates**

Quick questions, so, we will open some questions. First questions, out of the, from what Dr. Salamah said, and then we will go back and ask questions off from your interview questions. So you have a question.

**Student**

From the start, what I will be using. Are we able to assume that the scientist will be using this program are gonna know these terms? Or at what level of collaborate..

**Dr. Salamah**

That’s a very good question. I think that is what Dr. Gates was talking about. That’s something that you probably need to investigate and see. The most important thing is for you to understand what this mean, right? And then try to interpret it and put it in a language for the scientist. Is more appropriate for the scientist.

**Dr. Gates**

So the scientists, as Dr. Pennington was saying last time, do not want to use these words. So when you study HCI, you’ll notice that you always have to look at the different levels of users. You have the novice you know. So you end up trying to develop this where you, someone doesn’t have a background, maybe other pople are thinking they are all expertise and maybe want to very easily say, oh this is an asset. And maybe that is, you won’t know that in the interview, you know, and the scientist. And you start developing prototypes and see how that works. That is a really good question.

**Student**

Just to add more stuff, for the responsive relations between multiples, Is that gonna be over two? Or is it only gonna be used in sensors?

**Dr. Salamah**

At the time its two. At the time its two. At this time is two.

**Dr. Gates**

So desing change. Let’s remember to put it as a principle. So we are sticking it too.

**Dr. Salamah**

And I’m gonna add to that point. If you notice this list of items that we have, which is not final by any mean, this is different from what you got, last two weeks or so. So, this, after you develop the system, this, oh, this set of panels may expand and change continuously, so it is not for the set of pairs to be.

**Student**

With response, should there be a time delay? Like allowed to be the change between both of them, or let’s say temperature this, or this should be immediate to the reading?

**Dr. Salamah**

It’s again, at this time, its immediate to the next reading. Right? But.

**Dr. Gates**

That’s a really good question. And we are expanding the patterns so we can, we are gonna be looking at the time. That’s something that’s gonna come next week. That you can say, within the next ten readings, but it’s a more complex one, so we’ll give you that.

**Dr. Salamah**

But if you are asking these questions that means that you are reading, yeah.

**Dr. Gates**

Any questions.

**Dr. Salamah**

So you can be quizzed on pattern systems?

**Dr. Gates**

This is a harder concept than we realized. Trust me, because we are working on it. And we keep finding problems with things that we need to consider. What if this, there are a lot of what ifs. And you are gonna be stating to ask. This is what requirements elicitation is about. There’s a lot of assumptions. You know we talked about that. You are developing software. You are making assumptions that you understand it. And so you are gonna do properties. There are assumptions that you make when you define properties. So you have a sensor her, and you have a sensor here. Right? Dr. Salamah already talk about some of the assumptions that is that are calibrated. As we are looking at it, we are looking at the same one. This one and this one, they are recording at the same time, or time interval. That is an assumption. We should be thinking about how do you capture assumptions. How do you, the user. To articulate assumptions. Right, because this is about exactness. So I haven’t really heard any one asked about the readings themselves. Ok, I’m gonna open it up for questions. I’m gonna start with team one. Team one, what questions on your interview do you want to ask that hasn’t been answered. [13 seconds pause. No response from Team one] Ok I’m gonna move to team two. I’ll come back to team one.

**Student**

Uhm, how much accuracy does you need to be in the system in comparing the collective data properties to the properties created before the system.

**Dr. Gates**

What accuracy, right?

**Student**

Like a specific numeric. Is there a point?

**Dr. Gates**

So that is, an excellent question. That should be answered by Dr. Pennington, or any scientist. I think that from manipulation point of view you need to know how you store information. I think the question becomes also, one that the scientist should be thinking about when arriving to properties. And knowing how to set up your instrumentation. So the instrumentation is, uhm , the instrumentation is done through something called the data logger, and the data logger uh, will store that information and you can as some one out in the field, you can be saying: I want to collect in an hour, or in a hour minute. What about that last time, do you make it seconds? Do you make it go even microseconds? But that is a decision made by the scientist for the data they are collecting. So I would imagine that the system will have to be, that this will be left to the scientists. When you are setting up the properties. I think of some of the examples that you can see.

**Dr. Salamah**

I think at the time.

**Dr. Gates**

The first one. What has date and time. It has hours and minutes.

**Dr. Salamah**

And seconds.

**Dr. Gates**

So if you look at the handout, that one is going to be minutes and seconds. And then they talk about the calibration. You know, where they calibrate actually. Check to see if they are in sequence. The sequences being. As you know, this is where it is coming from. If you don’t calibrate it properly in seconds, and the seconds are not quite accurate, you get an accumulation of errors then pretty soon you are way off. So I would like to talk about the story, I might have give you this already. We were working in a system where we were storing different data, this was with the army, so we they were storing at different levels of accuracy. So when a message will go from the army to the air force, and then the air force send it to the marines, then back to the army. Same reading. It will get truncated and it will get back to the member who made the decision and then we will go back until we will actually see the arrow pointing in the simulator flying and it will drop, we didn’t know why. And it was a calibration precision error. What I will suggest is that this is what you are gonna do. You are gonna be writing down the answers as you heard it. And then you are gonna be validating. This is where the V&V comes into place. You are gonna be validating with the scientists and Dr. Salamah. You are gona be reading and interpret this accurately. Because once you start running your requirements, we have to trace them back to what we heard. So every time you say, the system shall do this and then you pass back to something in the interview of memo or correspondence. So, capturing this accurately is really important. And that’s why we are documenting everything. So that was a really good question. That that’s one that its gonna go back and validated with the scientist. Ok, team three.

**Student**

We talked about the time dependent, is there anything we should know about the time dependant data?

**Dr. Gates**

We are gonna cover time dependant. It’s a little more complicated. It’s so, what we are trying to do right now, is we are trying to look at ways to simplify it. So we are gonna do another pass with Dr. Pennington, and then we will get that on Thursday. So we all hear about time dependants.

**Dr. Salamah**

We’ll give you examples. But again with the time, it mostly means repetitions. A certain number of times. Or to pass after a certain number of figures, so that is the time we are talking about.

**Dr. Gates**

And duration. How long to make it last.

**Dr. Salamah**

Yes.

**Student**

A second question, just for clarity. Doing data maps and data existence, in the formal definition you have both saying the Boolean statement it never goes over scopes as hold. Is it never suppose to be never hold for both of them?

**Dr. Salamah**

That case is a mystery.

**Dr. Gates**

Very good question.

**Dr. Salamah**

Acces is never hold.

**Student**

Yes, because I was reading and I was thinking that was a little off to calibrate. Thank you.

**Dr. Gates**

Yeah, and when we start looking at multiple scopes, somebody asked that question, when we have more than one scope, you know it goes back to being very careful, because we have to say, how are we getting that, it could be and AND or an OR. Well is not holding so we are saying it doesn’t hold on temperatures over this scope. When we talk about two scopes.

**Dr. Salamah**

That would be more to relations.

**Dr. Gates**

But I might not have heard that in your questions. I mean when you have two different sensors, the scope, I mean we assume that they are in sync.

**Student**

So they are parallel scopes.

**Dr. Gates**

Yes.

**Dr. Salamah**

And the Boolean statement might have one single statement. It’s a combined statement. The first part might be applicable to the first scope. The second part might be applicable to the.

**Dr. Gates**

In a more complicated. So maybe the case. So yes that is a really good question.

**Dr. Salamah**

But yes there is a type here. I’m not sure for which. For the existence. The formal definition should be: the Boolean statement should hold at some reading within.

**Dr. Gates**

We’ll correct it and post it on piazza. Who is team one. Ok. Well questions.

**Student**

For these sensors, is it just one gigantic reading for one to the next, or is it one discrete intervals that it reads.

**Dr. Gates**

Scientists will set it up. So a scientist can say: “We are gonna collect data on the hour, we are gonna collect it continuously”.  Yeah, and, and when, when we start looking at multiple scopes I’m gonna ask that question, when you have more than one scope, um, you know it goes back to the wording has to be very careful because we have to say, well it depends, how, how are we doing that cause it’s an and, well could be an and or an or ??? that is not holding so, if we say it doesn’t hold on temperature, it never holds on temperature over this scope it’s also, we’re also saying it never holds if we have  two scopes.

**Dr. Salamah**

Right.

**Dr. Gates**

On the second reading, so when we talk about two scopes.

**Dr. Salamah**

Right I think that will be a little bit.

**Dr. Gates**

Later?

**Dr. Salamah**

When we.

**Dr. Gates**

Do the relations.

**Dr. Salamah**

Do the relations, um.

**Dr. Gates**

But I thought I heard that in your question, I mean, if you have two different sensors, the scope is, you know, there we assume that they are in sync.

**Student**

So they’re parallel scopes?

**Dr. Gates**

Yeah

**Dr. Salamah**

Right, and the Boolean statement might be on one single statement with ands.

**Student**

Or both of them?

**Dr. Salamah**

Right, but, but it’s an anded in the statement so, it’s a combined statement but the first part of it might be applicable to first scope, the second part might be applicable.

**Dr. Gates**

On a more complicated one.

**Dr. Salamah**

Right.

**Dr. Gates**

The one we’re gonna go over next week.

**Student**

Thank you.

**Dr. Gates**

So maybe the case, that there’s, so that’s also a really good question.

**Dr. Salamah**

But yes, there’s a typo in here, I’m not sure everybody heard it so for, for the.

**Student**

For the existence.

**Dr. Salamah**

For the existence it, it should not read the formal definition, it should be the Boolean statement B should hold at some readings within the scope.

**Dr. Gates**

Well, we’ll correct it and post it on, on the, yeah, piazza. Okay, are you team one, ??? you’re 3. So one, who’s one? No one responded to haha okay, one, questions?

**Student**

I did have a question about the time stamps, um, for these sensors, is it just one gigantic reading from one period to the next or is it, like, some discreet intervals of time stamps that are read?

**Dr. Gates**

Yeah, that’s set up by the, the scientist will set it up, so the scientist can say we’re gonna collect data on, on the hour, or we’re gonna collect it continually, or every 5 seconds, or every minute, so it’s up to the scientist to set up how they want to collect the data.

**Dr. Salamah**

But however it’s set up, the scope is being built by.

**Dr. Gates**

Whatever that.

**Dr. Salamah**

Distinct angles, by distinct times??? so if you have, if we’re reading every hour for example, well, then we have a reading every hour, we have 24 hour readings, now the scope could be any one of those, any one, any subset of those 24 readings

**Dr. Salamah**

For the existence, it should not read, the formal definition should be should hold at some reading within the scope.

**Dr. Gates**

We’ll correct it and posted on piazza

**Student**

On piazza

**Dr. Gates**

Ok, are you team one? You’re three. So one. Who’s one? No one responded to one? Ok one. Questions?

**Student**

I did have a question about the time stamps. Umm for these sensors, is it just one gigantic reading from one period to the next. Or is it some discrete interval from time stamps that are read

**Dr. Gates**

that, that's set up by the, the scientist will set it up. So the scientist can say we will collect data on the hour or we are going to collect it continually, or every 5 seconds, or every minute. So it’s up to the scientist to set up how they want to collect the data

**Dr. Salamah**

but however, it’s set up the scope is being built by distinct, by distinct time steps. So if you have - if, if we're reading every hour for example, well then we have a reading every hour, we have 24 hour readings. Now the scope can by anyone of those - anyone- any subset of those 24. Yeah

**Dr. Gates**

whatever the ???

**Student**

I had a question about the formats. Umm, we talk about the interface as having to display the information, but did need to have us like also with have an implement of downloading the information with a certain format - like a text file or a uh document file like that, a pdf.

**Dr. Salamah**

I think that's more for

**Dr. Gates**

Ok so your question is -

**Student**

Like instead of just displaying the information, do they need us also to be able to like provide them with yeah like a or a form of download, like a PDF or text or

**Dr. Gates**

Ok, depends on what you’re talking about with the expected information. If you're talking about the information itself, umm you’re not concerned with the data of downloading the data. And then you format. That's an, that's a job of some other system right? But you’re concerned more about capturing the properties, and then possibly graphing the data to show you know the grasp in relationship to the properties so you're doing the visualization of that data. And that's umm there should be a lot of questions around and how they use - how do you start, how do you visualize the data, and how do you set that up. So if Dr. Pennington said I can be in front of machines and I could be even at this visualization wall and I may be sharing temperature data, I may be sharing a lot of data on this wall and I may I just I just want to see this continuous - if I’m doing near real-time and continuous feed of data and how it’s mapping on how it’s mapping to my properties. That may be you know one thing, but to do that I mean I’m going to stop there. So I’m going to prompt you to ask more questions. Did that answer - you were more concerned about the properties, displaying the properties and getting the report on what the anomalies were.

**Student**

Yeah, so like instead of having to like I guess log back in to the system and having to request the same properties to be displayed - if like a, like a document that's already pre - premade you could just like open that up and it already has that information

**Dr. Gates**

Right, so, so if I hear you right. I’m a scientist in the field. I’m working in Hornado, I have a lot of properties already. Right? I should be able to re-use those properties. yeah. The answer is yes. Or I should be able to look at those and change them and select from that. And create a subset. Then, yes, absolutely. Ok.

**Student**

Just to clarify on his question, ok so what I’m getting from him, it’s ok to implement a caching system, basically?

**Dr. Gates**

Not caching, well caching - I don’t know if he's saying?

**Student**

I guess it's like what he's saying because he wants he wants to download something and reuse it instead of sending a request. So in a similar way a cache could be storing information

**Dr. Gates**

Yeah but caching is if you're talking about caching away, I understand caching from operating systems is that in as more information comes in your cache is only so large, it goes away. Right, if you keep on adding new information that goes into your cache. Umm. The reuse, the reuse is - means that for me it’s more of a repository I don't think it’s truly a cache because you're going to be, once you're monitoring, you're monitoring over, you're monitoring over months. I mean you set it up and it’s going for months. Unless you're going from site to site to site. What you set up is what you set up, for that period of time. You’re not setting up for 24 hours typically, you're setting it up for weeks. So these files are huge. And that's a huge, that's a big problem for the monitoring side of it. We're not going to worry too much about that. Yeah, I don't think it’s, I don't, I’m not sure how a cache would be, and still that's more of a solution of the of a model for that.

Yes?

**Student**

You were saying the files uh in storage might actually be of a greater size, so that would affect the performance and affect the actual time enhancement, so how would we go about informing the client of that.

**Dr. Gates**

So there is, there is this whole again, separation of concerns, in terms of - of may- maybe some separation of concern - well, ok. It is at one level. So separation of concerns is, is how do you deal with large files and then how do you do the monitoring. And it’s more of a concern when we're starting to look at near real-time. Right? When we're starting to look at near real-time it’s streaming. So we're streaming information. You're system is not concerned about storing that information. It’s being streamed and you're just pulling it out in real time. The data logger system is the one really storing that. Or it may be transmitting it to some, you know, storage. Umm. So I would separate that because we're not concerned with that side of how it’s storing it. Umm. Well, if you start looking at historical data, then that's a different story right? Umm. Now we're saying I’m looking at what I have in real time and I want to compare against data that was collected last year. So that is stored some place. So, so far we haven't heard from the, from the, any requirements that deal with performance, so performance is a quality umm, attribute. Right? And it’s an important thing to talk about. You want to ask the customer that they are concerned about the performance. But it all depends on, again, on how you implement it. So you may have this huge file but you may just pull out the area, the time of interest. Which is not as large. Ok. So again, we go back to implementation issues. Uh, it’s a good question to ask if performance is an issue. That goes back to your customer, to the scientist.

**Dr. Gates**

I like the kind of questions you're asking. I mean I think they're really potent I want to hear from more people. Team four? Let’s see, we went one, we went two, right, we went three. Team four?

**Student**

That's us right? Yeah. Well I know we, I know you touched on the rf at the f, if the rf did not exist. What if the rl did not exist. Do we just not - do anything about that? And just keep moving forward every time?

**Dr. Salamah**

You're scope is not built. If rl you're saying that the left part of the scope. Until you get that l until you get that first condition that builds that left side of the scope, then that, then you're, you're scope is not built, you don't care about the property yet. Once that happens, then you wait for your r for the - r letter - the reading correspondent to the r. And then that's your scope is complete. But if any one of these, if the l is not there, your scope is not built. If the r between l and r is not there, your scope is not built. And you don't care about the property anymore. So you first have to make sure that your scope is built.

**Student**

Ok. And that's always determined by rl. Lr , I’m sorry I’m ??? the name.

**Dr. Salamah**

But now, the question that was asked is, if we're doing this real time, you're not going to wait until the scope is built. Right. So, that's, that's the harder question. You have to think about how that can relate. Do you understand the problem? You’re thinking existence between l and r. Will L happen? Now I’m looking for if this sets of some sort of a condition, will, but I know if I really care about it or not because I don't know if the scope has been built yet because of the r. So that's an issue that you have to really.

**Dr. Gates**

So you're going to be creating use-cases out of this problem right? A use-case is real-time. You have a display. You're finding potential anomalies, haha, because, you reached r but you haven't gotten to r yet. When you - you're um building onto l, haha, you don't know if r is there, but you’re finding if these properties are not holding. That's a scenario right? What does the display look like? Mmkay? So just think about it. So this is going more towards the prototyping part, because you're going to be looking at potential solutions and you're going to be presenting them to the user when you prototype to say this is how we think it should – what - what we should do. Or you don't do anything right? Are you going to do it at [inaudible]. And there's a lot of decision inquirements here, but part of dealing with complex problems, you know I think may be convinced that this is a complex system that you're trying to build? I mean it’s not that easy. You can't just go out and build it. Umm maybe originally you thought oh yeah we can create this. But once you start digging in, thinking oh. We're the - there are different scenarios. That's when you - that's the complexity of it. And trying to nailing that down this semester before we start implementing next semester

**Dr. Salamah**

I’m just going to add something in terms of software engineering. What you're doing right now is really one of the hardest things. Is making sure you understand what needs to be done and whether or not you can do whether or not it’s feasible or not. So one of the things you really have to learn is to push back with that customer and say you know what, this, we - we just can't do this. But now, you have to know how to do this. And you cannot just say we can't do it. You have to document why. You have to bring a convincing argument why this can’t be done. In terms in performance for example the performance the customer requires specific performance attributes saying that it has to be, from this within this second. You have to do some calculations and go and say you know what, this is just not feasible. So you have to learn that not everything that the customer says has to be done, preferably yes, but you can push back that’s part of your job, but you have to say why you’re pushing back and why it’s not feasible.

**Dr. Gates**

We have this afternoon a highly distinguished speaker, Dr. Amelia Flores from IBM, smart planet. So she spoke to us yesterday, to women on campus. One of the things she said is the biggest attribute for the people she hires. So she hires students who come in and she hires people to work for here on the smarter planet initiative, smart cities, you know what that is? It’s IBM’s big push to bring in technology to make it a better world on how we do things with the technology.

Are people who will just sit there and you know no matter what you say there not gonna accept it, no that’s not you have to know balance but asking those questions is what we’re trying to teach you right now. I said earlier that the biggest cost of development is maintenance, why? Because you didn’t develop what the customer wants, so you have to keep going back and fix it, and its because you didn’t have a good design and all of that, and you didn’t design for change, because the system is not a good system to begin with. The more time you spend on requirements the better it is in terms of developing what the customer wants, this is an important job to go into this area of elicitation. So this woman is speaking at five o’clock at the Undergraduate Learning Center you should go and hear her talk, because she’s gonna talk about innovation and where she spends a lot of time, she goes into cities so she’ll go she went to New Orleans, stayed there for a whole month, and just talked to people and talked to people in government trying to understand what are your needs as a city to rebuild, how can we help you. So she it took them a whole month and she said they were in a hotel room everyone was there, they have financial people cuz of separation of concerns of financial issues, there’s the technical issues, there’s the people what people need and want and so there look at you know, they’re just sitting there brainstorming whole time to come up of these new solutions its really kinda an exciting job. I would love to have a job of innovation. So you’re doing that that’s what we’re training you to do right now is its not just something you have to do in the class, its something I hope you take with you in the work place. Ok so Marik what questions do you have?

**Student**

. . . .

**Dr. Gates**

huh? None? Off of your, everything got answered in your interview ok, anyone else going back?

**Student**

Going back to the maintenance umm I don’t know if this got asked already, but can we anticipate something. So lets say you have um at the moment you have these sensors that measure W, X, and Y, and how likely is it that a, is it possible that a new sensor that comes in that measures Z is that likely at all or do you just

**Dr. Gates**

Yeah its likely, yeah its very likely umm you’re adding sensors all the time and I don’t know if you’ve seen it we’re missing our visualization person that I can show you actually on this wall. You can see there is robotic trams that are miles long that they are collecting data, reflectance data and then there’s satellite imagery that’s also collecting data, that those two there’s a relationship between those two types of information. They have towers up in Hornado, the towers are really high and there’s sensors on the tower at all levels and so they may be adding new sensors to that tower and then may want to say, ‘well ok now I wanna look at the relationship of this reading with another reading or historical reading,’ to see you know there’s something interesting there that I can deduce from that. So yeah it’s likely adding new sensors, and so when you add new sensors you still may want to reuse a property right? But just change the sensor, maybe change the threshold, so reuse is gonna be important.

**Student**

We talked a little bit last time that the sensor will feed data in a specific format, is it our job to change that format into a unified format that our system can use? Or will that already be happening? If not if a new sensor does show up we have to give the user the ability to create some conversion point?

**Dr. Gates**

Yeah good question, I’ll have to think about that one, umm ok I think it’s the job of the scientist, I wish we had Diana come back. It’s the job of the scientist if you have a new sensor to set it up in a way that they can do comparisons, but I think its more their job to set that up, not your job not the system’s job. The system’s job is to be thinking about queues or thinking about questions to prompt some of the questions you asked, I think you can prompt the user to say you know, ‘is this calibrated with this or this sensor is recording at a different level than this sensor.’ So providing information back, that’s my answer for the scientist answer, so I think you should document that question it’s a good one and I’ll validate on site.

**Student**

When I introduce sensors on a measurement app, how are you gonna display the sensors would you display them as two different when the measurements are different?

**Dr. Gates**

Right you couldn’t overlay them on the same graph that’s for sure right? And it kinda goes back to your question, I mean are we responsible for doing translations and I don’t really think we’re gonna do translations with the data. I think that so you cant do near real time if they’re not the same, but what you can do is inform the user that these are not the same and then a different part would be doing translations. Then it would be that’s something that’s added, that’s what we’re asking to do right? But the solution would be to a transformation of that data, which is done quite often you take a data set and then you transform it to what ever the time, cuz sometimes it’s a Julian dates, sometimes its Roman, sometimes, and its differences. Some things all the way to seconds and you only want hours and you’re gonna want pull out only hours, that’s preprocessing and so you couldn’t so you’ll have to provide a warning statement.

**Student**

So are they gonna want not just the anomaly displayed, but also just the regular data displayed?

**Dr. Gates**

No I think that well. If you’re doing monitoring and they want to see as data comes in what it looks like, and you’re graphing that they’re not gonna ever want to see the data itself. It would be on a scaled graph right? And then the important thing is there are two things, as I understand it, this is a question that goes back to the scientist, but you would stream in the data and show it. Now there’s gonna have to be a lot of question that you’re gonna have to ask about, how am I gonna graph it? Because are you really graphing it by the second, by the minuet, by the hour, again it should be a user choice. I set it up the way I want it, and then what they care about is when an anomaly occurs. So as I heard Dr. Pennington last time talk, she said I wanna know where the anomaly occurs and what that anomaly was, ok so that’s one mechanism on a graph and maybe using ok. How you do that? Again that’s a how it goes back to prototyping. The next question prototyping and asking questions from the user, you know, someone did that last time, and someone asked do you want particular colors? Do you want us to mark it? Those are the types of questions you need to be asking for the graphing piece, it may be that you want to create a report of the anomalies, so at the end of the day I wanna see the anomalies and when they occurred where they occurred.

**Student**

So there’s anomalies for different things right? One for weather and so are you gonna want us to display those separately as well as together?

**Dr. Gates**

Question for the customer, that’s a really good question.

**Student**

I just thought about this, we keep bringing back the sensors to the user and the way that I’m hearing it, is that each sensor and user has a one to one relationship, but is there a possibility that a sensor can be used by multiple users? And that if increments of representation so one person might say ‘I want my data to be saved every hour’ where somebody might say ‘I want it every ten seconds’

**Dr. Gates**

If you’re using it that’s a negotiation with the scientist in the field, so I would imagine that if that’s the case. You would get the ten seconds data and the other person would process the data to pull out a year, that’s how that would happen, but it is being used by other people and actually the data is used by many people around the country, and actually the data is being used by people around the country. It’s international so everyone stores it in a place where we can get access to it.

**Student**

And everyone would have access to the sensors for maintenance and changing the calibration.

**Dr. Gates**

So someone is responsible for that at the field site.

**Student**

Would it be like an individual or a group?

**Dr. Gates**

usually its it could be a group of individuals, but usually someone is tasked with that job. So there’s a way to log it, you can do the calibration and so we’re getting into some really interesting questions that are center cyber share center actually works on. That’s the promiance of, who does it? What do they do? How do they do it? Do you trust that person? And when did they do it? Those are important questions but we’re gonna separate that from what we’re trying to solve, but I really like that question to document, because I actually think that I hadn’t thought about this, but I think it would be I would like an interface that where we kept the data maybe we’re already doing that, but I don’t know. That’s a really good question that’s not what we’re doing on the system, so other questions? Yall are perfectly satisfied? We’re gonna see really good interview summaries? Remember we’re gonna ask you to write an SRS and SRS is gonna be, you’re gonna do use cases, and scenarios so you need to be prepared. How to write down how the system will be used and the scenarios associated with that. You’re going to be giving requirements from a user perspective, from a functions, from a response action, you know looking at a bent of actions and a lot of different perspectives. Software requirements specification is a very large document, the information we’re giving you now is the information you’re going to be creating in that document. I expect then that over this next couple of weeks that you’re gonna be asking for additional information from the user, so you’re gonna be writing memos that go though, us the guidance team before it goes to the scientist. We don’t want you to talk to the scientist directly because she’s a very busy person, and we want to consolidate questions then send them out to her for an email response and get that back to you, but this is a process to get the rest of the requirements. Anything this is it unless you ask more questions, unless you ask for more information we are gonna have one more interview as I said on thusday. So I want you to use your time as a team to really start digging, and start saying ‘do I really understand this? Can I start doing my use case and scenarios?’ Ok so the next thing we’re gonna do after we have an exam, we have another piece of information that we’re gonna give you. We may not use a whole hour, and then we’re gonna start to feasibility reports and so feasibility reports means you’re gonna have to have your use cases done, and then as Dr. Salama eluded to, you’re gonna start looking at the feasibility of the system. From many perspectives, how will it be implemented, possible ways to implement it, challenges, how much its gonna cost, how much time its gonna take, all that stuff. So the feasibility report is then will precede some of the modeling we will do, because once you start modeling then you’re gonna understand the requirements even more of what you know and don’t know. Ok so there’s a lot of work to be done, I hope you’re enjoying it, because I enjoy this class because you get to work as a team and you really see what its like to be in a company.

**Student**

So right now you’re saying all the information coming from the sensors, are we gonna be hosting anything or are just gonna be constantly pulling?

**Dr. Gates**

You’re always gonna be pulling, you’re not gonna, the only pushing you’re gonna do is to document an anomaly.

**Student**

So we’re gonna have to have a constant internet connection if we’re gonna be going though a browser or an application.

**Dr. Gates**

Yes, the customer wants a web base solution. Because that’s, it’s mainly about capturing the proprieties. And then initiating the monitoring with those properties. Okay? You’re kind of creating two separate things here in many respects you’re gonna be capturing the properties and having a way then to plug them in to start the monitoring. So we want to see how the properties work the way we have collected them. So will be giving you data files that are seceded with anomalies to see how well your system works.

**Student**

Dealing with stuff that’s already archive and then going forward from what you said from [inaudible] properties [inaudible] that’s gonna be the toughest part trying to capture anomalies from left to right with existing real-time information that we have forward.

Gates: Now we’re gonna simulate real-time or will also be historical?

**Dr. Salamah**

That’s a tough one, that’s one that you’ll have to really consider, think about. Spend some time thinking about how you’re gonna do that.

**Dr. Gates**

Capturing what needs to get done. So there is capturing the properties. There’s displaying them, right, through graphs. What kind of graphs? How do you do that? And then or just monitoring them and capturing the information someplace and generating a report that says at the end of the day or whatever the customer would want it to say okay what anomalies came. Cause they may go and take a break and something showed on the graph. You would want to have information that you can go back and look at.

**Student**

So would it seem like more work if you’re going from left most point when you’re starting the data properties and you’re comparing that to archive information that are already have program concrete or from whatever that is and moving forward to queering whatever you’re getting now from real time. I now it sound more complex but won’t that, make it safer that way.

**Dr. Salamah**

I’m not sure that’s; cause your combining real time with historical data. I’m not sure that’s the intent of it. Unless you doing some sort of predicition…

**Dr. Gates**

You can do predictions and take historical data be comparing that with the real-time data.

**Student**

[Question not understandable]

**Dr. Gates**

So if you want to do real-time, checking predictive values. Yeah, you should be able to do that. I don’t see why not. [Pause] The only thing I was a little confused with your question was about left and right because every property has a different scope. Some may be between L and R. Some may be always global. So it’s… I just want to make sure that’s clear.

**Student**

I have [inaudible] for a scenario, that I like to see what you think, cause you where saying that they need internet access but let’s say someone is out on the field and they have a mobile device doesn’t have internet capabilities but they would have the device obviously in some kind application form of the server that we have so will they be able to enter information and have it uploaded to the server later and if so wouldn’t that kind of cause some discrepancy as to the time stamp that is updated?

**Dr. Gates**

Well the time stamp is associated with the data being collected itself and you have nothing to do with the data collected. That’s only your input.

**Student**

So it would be not going off when it was uploaded server, per say.

**Dr. Gates**

So… There are two things here. We’re talking about capturing properties which doesn’t have to be, you can do that anytime. I think what you’re talking about is now initiating the checking of those properties. So the way we were doing it out in the Arctic, is that the scientist had a little hut with a computer and they would have a signal that was transmitted it. So once they loaded it in to where they had internet connection then they started it. I would imagine that some of the scenarios are “I’m doing this in my office and coming up with properties cause I’m trying for a data collection that’s starting next week or tomorrow” or you know. So I’m doing it separately. So I’m thinking the scientist will understand the limitations. I think, when you get to the SRS, there’s a whole set of assumptions. We have a section about assumption and you’ll be putting some of these assumptions there. So you’re assuming that there’s internet access because that’s really more how they will go about handling the ability to actually do the monitoring. Without knowing the technical ways of you know can we go and put in the data logger or wherever the data logger is storing it. I don’t know the answer to that question. Cause that will be the other option right, I don’t have internet but I want go ahead and monitor. So where’s the data being collected and can I put a probe in there to collect it. That’s a harder thing and I would think it would be outside of our scope. [Pause] You’re all good?

Student: Are we assuming that all of the data is gonna be kept and nothing is gonna be discarded.

**Dr. Gates**

Okay, yes. Again, separate the data which is done by the data logger and sensors. It’s outside of what we are worried about. So make the assumption that you’re going to, that you’re gonna be, that you will capture the properties, right. And specify properties, reuse properties all that, okay? That’s part one. Part two is this, now that you have them, which are the properties you’re gonna monitor in real-time. So you’re gonna assume that data is gonna be stream into the system and somehow get access to it and you’re gonna use the properties to check and to provide live streaming through graphs. Then the other scenario is that you have, you analyzing a set of dataset was capture earlier in the day or the previous day or previous year or previous flying years and you’re gonna do some monitoring on that day. You’re gonna take that and feed it into and check for anomalies on that. Maybe multiple data sets so you have different files and you’re gonna just take the files and do check up on the properties. Which is a different [inaudible]. So you kind of see the different scenarios.

**Student**

If you would to back and check a certain time frame, says this is my scope and I just want to check this. With the [inaudible] and consecutive terminal L and R scopes it really depends on where you put your start point if you do it right after an L then it’s not gonna say that this is a region and it’s, how we gonna go with that.

**Dr. Gates**

That’s a decision that you make. You’re saying “I’m starting this at, I’m gonna take the data from January 29th, 8:00 o’ clock until May something”, you know midnight and you just start monitoring from there, so if it’s not there it’s not there.

**Student**

So it is like the L [inaudible] just one day before you started.

**Dr. Gates**

It’s not gonna find it. That’s the decision of the scientist, right. There saying “I only care about this” and so they’re really caring about at our first snow in El Paso we expected this to happen. And it happen on Thanksgiving day, they should have done the research and say this is my scope or this is a period of time I want to look at.

**Student**

For the nearest L close to this day binds that one…

**Dr. Gates**

No we’re not doing that…

**Dr. Salamah**

It becomes much more complicated.

Student: You were speaking about streaming. [Inaudible] the scientist I can imagine receiving text message when an anomaly occurs, so does our system supposed to be looking at the graphs and setting up some kind of [inaudible] when anomaly occurs email or text message.

**Dr. Gates**

So you’re saying they’re looking on a mobile and looking at…

**Student**

Yes, she said so she can imagine receiving text message and something wrong with sensor she can have a look.

**Dr. Gates**

Yeah, I think that Dr. Pennington said that. She will like that. She would like to receive a message on a anomaly cause you’re on the field and you want to know, you know, did a bird fly into my wind blade and that’s why my data is bad now, so yeah.

Student: So our system is suppose to take action on its own or just display real-time graphs?

Gate: No, it’s just notifies it. So one scenario is displaying another scenario is sending a message. Yeah, that’s an important piece of it. Okay? Well thank you everyone, I appreciated.

Yes the customer wants a web based solution, because that’s its mainly about capturing the properties, and then initiating the monitoring with those properties. Ok so you’re kinda creating two separate things here in many respects you’re gonna be capturing the.