Design and Implementation of Human – Computer Interfaces
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Module No # 02
Lecture No # 08
Case Study on SRS

Hello and welcome to NPTEL MOOCS course on design and implementation of human computer interfaces. So in the previous few lectures we learned about interactive system development life cycle and we started our discussion on requirement gathering analysis and specification stage of the life cycle. So we will continue our discussion on this stage which is one of the several stages that make up the whole life cycle.

Now earlier we have seen that in the requirement gathering analysis and specification stage there are 3 distinct activities one is gathering of requirements which includes both usability requirements as well as other feather related requirements from the clients. Then we have also seen analysis of those, requirement gathering outcome so that we can finally come up with specification of those requirements.

We mentioned that at the end of these activities what we get is a document which is called software requirement specification or SRS. Now SRS is the outcome of the stage of requirement gathering, analysis and specification this document is passed on to the next phase to the next stage of the life cycle the design stage. Where based on this document we go ahead and build a design document. So SRS creation is very important activity and subsequent activities of an interactive system development life cycle relies heavily on this stage.

Now so far we have seen what are the different types of requirements? Usability requirements which are one of non-functional requirements we have also seen functional requirements we have seen how we can specify functional requirements. We have also mentioned that non-functional requirements can be specified as functional requirements after conversion later, on, we will see some more examples on this.

But in this lecture what we are going to discuss is a full SRS document how it is created what are the components present in it how it looks. And so on because so far we have discussed the concepts related to SRS document in a piecemeal manner. Let us now try to put them together and see the whole document for better understanding of the documentation process.

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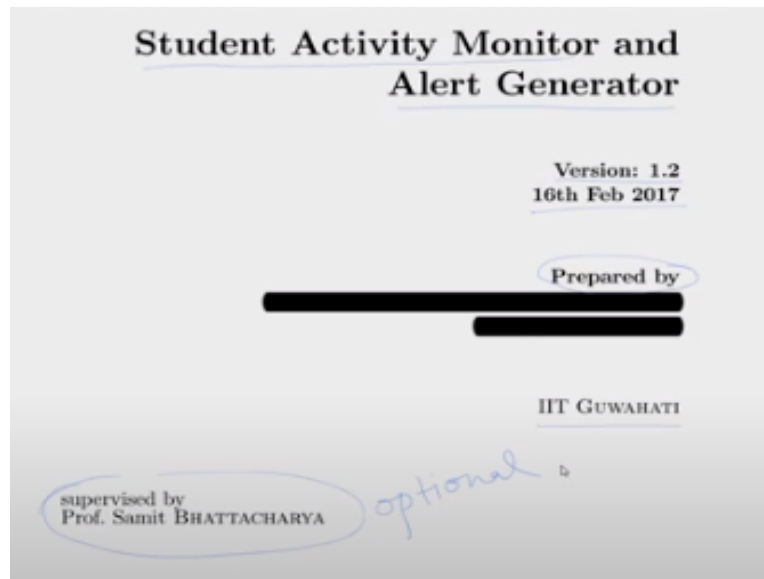
So the document is supposed to have a cover page for example here we can see the cover page of a document SRS document created for a specific system the system is student activity monitor and alert generator. So this is the name of the system which, does few things namely monitoring student activities and generate some alerts based on the activities. So we can name it as software requirement specification for this system then note that few more things are mentioned like person name.
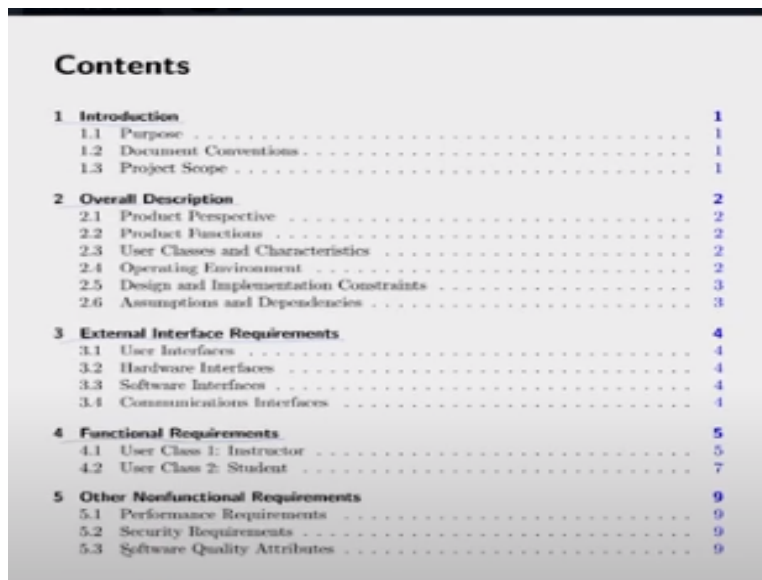
So it need not be the case that the final document is the only document that is created it may have undergone several changes and evolved over time before it is finalized. So, each of these intermediate documents are given a version number to distinguish it from earlier and later documents or versions. And that information is ideally to be conveyed to the reader of the document through this convention the current version of the document along with the date on which this document is created.

Then ideally in the cover page the persons or the team that created the document should be mentioned. So you can mention prepared by so and so and so and so giving the name of the team

members. You can also provide the place where it is created for example here it is mentioned IIT Guwahati so IIT Guwahati it has been created. And if there is any mentor who helped in creating the document like here the way it is mentioned.

So, in the cover page then what we should keep first this title software requirement specification doc for student activity monitor and alert generator which is the name of the system. Then version number then date on which the version on which this version is created. Then the people who have created it prepared by so and so place where it is created and finally if there is some mentor. So this of course is optional and it need not be present everywhere but other things ideally should be kept in the cover page or the title page.

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Contents

Then comes; the content section so here for better organization ideally you should include one content table of contents. Which; will list out the content of the document in the form of sections, and sub sections as you can see here in this document there are several sections. Section on introduction then overall description, then external interface requirements, functional requirements other non-functional requirements and so on.

Now under introduction section as you can see we have several subsections named and labeled accordingly say purpose of this document, document conventions, project scope, scope of the project. Similarly under overall description we have several subsections product perspective, product functions, user classes and characteristics, operating environment, design and

implementation constraints, assumptions and dependencies these are subsections under overall description section.

Under external interface requirements subsections are user interface, hardware interface, software interfaces and communication interfaces. So, all sorts of interfaces that are part of the documentation process are covered under this section. Then for functional requirements so we already discussed that in the SRS there are primarily functional requirements and also non-functional requirements.

For functional requirements we have one dedicated section functional requirements where for a different class of users the different functional requirements are provided. For this system there are 2 user classes identified instructor and student this system is primarily meant to be used in a classroom setting. So there will be an instructor and several students so for each of these stakeholders of the system or the end users you have different functional requirements listed here.

A separate and dedicated section is there on non-functional requirements such as performance requirements, security requirements, software quality attributes and so on. So these are the way the overall content of the document is organized in the form of sections and sub sections.

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Next ideally you should include in your SRS some revision history. As I mentioned the document may have gone through several iterations before it is finalized so each, iteration is a version. So how many versions have been created a brief history can be given for example for this particular document. This section revision history notes down or indicates that there are there were three versions created version 1, version 1.1 and version 1.2.

So version 1.0 was created on this date it was the original document created then on a later date version 1.1 was created based on the comments received from the mentor of the team. So this second version is modification of the original document then in another later a third version, version 1.2 was created which was the final version for the SRS document. So this is again after some more comments were received from the supervisor or mentor of the team.

So ideally in a SRS document you should list this revision history for record keeping then the actual content of the document starts.

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So it starts with the introduction section as we have seen in the table of content section so there are several sub sections. One is purpose what is the purpose of this document why we are creating it here in brief you are expected to write the purpose. For example for this document the purpose is written as the purpose of this document is to give a detailed description of the requirements for the student activity monitor and alert generator software.

So that indicates the purpose it will illustrate the purpose and complete declaration for the development of system along with the system constraints that is also one of the purpose for this document. This document is primarily intended for intended to be proposed to a customer for their approval and as a reference for developing the first version of the system for the development team.

This is the more crucial aspect of the purpose that it is to be shown to the customer for their approval and then it is to be shared with the development team for them to start design and development process. So that is in brief you should include the purpose for this document. Then if you are using some conventions in the document for easy understanding of the readers of this document you should list those out in a separate subsection as shown in this document.

So there is a dedicated sub section document convention under introduction section where all the conventions that are used in this document are listed. So it is a table having 2 columns one is the term or the notation used another one is the definition of that particular term. For example when the term instructor is used it is defined as person who shall be using the software for monitoring purpose.

When the term student is used it is defined as person who shall be monitored by the instructor. When the term device is used it is defined as an electronic device using which the instructor is delivering their lecture. Then when the term DESC or DESC is used it refers to description of something. Rat convention refers to rational the short from of DEP dep refers to dependency. So these are some of the conventions short forms and terms used to indicate things that are listed out in this subsection.

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The purpose of this document is to give a detailed description of the requirements for the Student Activity Monitor and Alert Generator software. It will illustrate the purpose and complete declaration for the development of system along with the system constraints. This document is primarily intended to be proposed to a customer for their approval and as a reference for developing the first version of the system for the development team.

1.2 Document Conventions

Term	Definition
Instructor	Person who shall be using the software for monitoring
Student	Person who shall be monitored by the instructor
Device	An electronic device using which the instructor is delivering thier lecture
DESC	Description
RAT	Rational
DEP	Dependency

1.3 Project Scope

This software is meant to be deployed in an IT-enabled large classroom environment where in the lecture delivered by the instructor is via a device through which both audio and video are transmitted. This software shall allow the instructor to conveniently monitor the attention of their students in real time.

Then in the third subsection of the introduction section the project scope is reported. Ideally you should do that also so it says that this software is meant to be deployed in an IT enabled large classroom environment wherein the lecture delivered by the instructor is via a device through which both audio and video are transmitted. This software shall allow the instructor to conveniently monitor the attention of their students in real time so in under the project scope subsection you explain the need and objective for this project in brief.

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2 Overall Description

2.1 Product Perspective

This software will be a top up on the already existing system for communication between the instructor and the students inside a classroom in which the slides of the lecture are delivered to the students' devices along with audio which they can listen to via ear phones. The slide transitions are handled automatically by the existing system. The responsibility of the proposed system shall be to monitor the attention of the students and ensure that they are not chatting/slacking or are indulged in entertainment.

2.2 Product Functions

The product leverages the sensors such as gyroscope, proximity sensor, accelerometer in the devices used by the students which determine factors such as orientation, distance from user, shaking frequency which enable the system to determine the attention of students and alert the instructor accordingly.

The application should also allow the instructor to see the summary of the data collected during lecture which shall be helpful during feedback sessions and grading.

2.3 User Classes and Characteristics

The users are divided into two classes viz. the instructors and students. The students interact with their mobile device having the sensors which are used to determine their

Then we move to the second section that is overall description note that first section we already covered first section on introduction where the 3 components that are shown are supposed to be

present in your document. So ideally you should list out those things and the extent to which you provide content under each of these subsections is up to you so it can be larger smaller but ideally it should be brief and to the point.

Now let us move to the overall description part it again is divided into several subsections one is product perspective which lists out or which explains the perspective for this product. This software will be a top-up on the already existing system for communication between the instructor and the students inside a classroom. In which the slides of the lecture are delivered to the students devices along with audio which they can listen to via earphones.

So it is talking about some existing system where something is already done and this system is meant to be a top-up addition to that existing system. The slide transition are handled automatically by the existing system the responsibility of the proposed system shall be to monitor the attention of the students and ensure that they are not chatting, slacking or are indulged in entertainment.

So it clearly tells us what is to be expected out of this system? It tells us that there is already an existing system few things that our, that this current system is going to assume are already part of that system. And based on that assumption that those things are already working in with the existing system we are going ahead and building this system whose sole purpose is to add to the existing system rather than proposing an entirely new system where everything is to be done.

So that is the product perspective in this way you are expected to write the perspective for your product as well. Then comes, the product leverages the sensors such as gyroscope proximity sensor, accelerometer in the devices used by the students which determine factors such as orientation, distance from user shaking frequency which enable the system to determine the attention of students and alert the instructor accordingly.

So it tells us that what the product assumes to be available and what it does? So it assumes that some sensory values are already available from specific sensors that are already part of the setup. And if those values are available then only it will work and it will produce something which is the objective of this system namely determination of attention of students and generation of

alerts. So determination of attention and generation of alert are the objectives but it depends on the availability of sensory values that is clearly stated in this section product function.

The application should also allow the instructor to see the summary of the data collected during lecture which shall be helpful during feedback sessions and grading. So apart from attention determination and alert generation one more functionality is to be expected out of this system that is it should allow the instructor to get a summary of the data collected during lecture for certain purposes. So that also is mentioned here so effectively this subsection reports what the system assumes and what it expects to deliver?

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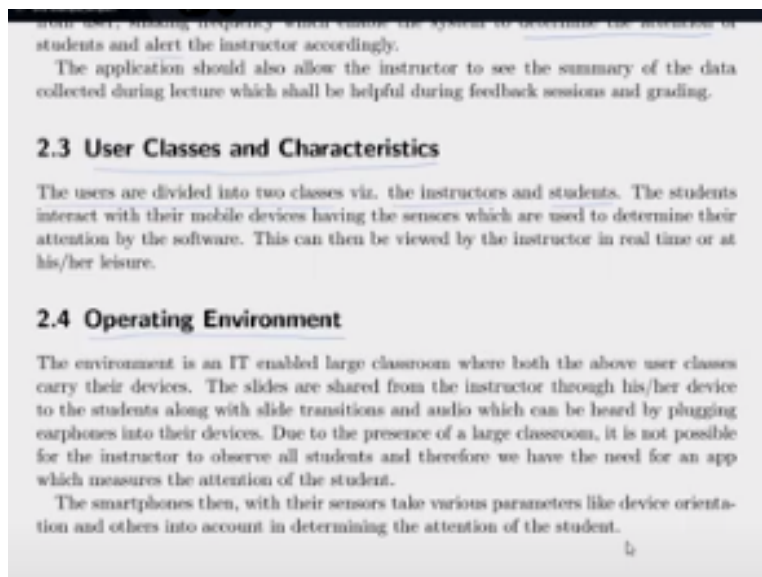
The third section is also interesting subsection user classes and characteristics so from the point of view of this system which is a classroom monitoring system we require 2 types of users. Users are divided into 2 classes the instructors and the students the students interact with their mobile devices having the sensors which are used to determine their attention by the software this can then be viewed by the instructor in real time or at his or her laser.

So in this subsection what is being told is that? Who are; the end users? So there are 2 types of end users students and instructors. Students will use the system on their mobile devices having those sensors specified in the earlier subsection and the data generated will be processed and produced as output and displayed to the instructor which will list out relevant details to him or

her. Now that, details can be viewed immediately in real time or it can be viewed by the instructor at a later time so that is also specified here.

So everything every aspect related to the product is supposed to be briefly introduced in this document. The fourth subsection under this second section is on operating environment so what is the operating environment for the intended product it clearly states that. The environment is an IT enabled large classroom where both the above user classes carry their devices the lecture slides are shared from the instructor through his her device to the students along with slide transitions and audio which can be heard by plugging earphones into their devices.

So the students can get the instructors voice through headphone or earphones due to the presence of a large classroom it is not possible for the instructor to observe all students and therefore we have the need for an app which measures the attention of the student. So it essentially tells us about why we need it the smartphones or the devices that the students are carrying, with them as well as the instructor is carrying with him or her. With their sensors take various parameters like device orientation and others into account in determining the attention of the student.

So the operating environment is an IT enabled classroom environment students and teachers carry their mobile devices smartphones with them. And they are connected to each other through the system when they are using the system these sensors present in the devices capture the data sensory data and that data is processed to produce the output required for the teacher to monitor the students. So that is clearly stated what is the operating environment under this subsection.

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2.5 Design and Implementation Constraints

For the above purpose of implementing the app, we are forbidden to use the camera for measuring the attention. The students might exploit the sensors used to portray themselves as paying attention even when they are not.

This gives a false positive in cases when the student uses a stand to maintain the orientation rendering the accelerometer and gyroscopic functions redundant.

2.6 Assumptions and Dependencies

We assume the presence of an IT-enabled large classroom with the availabilty of a system that can display slides from the instructor to the students along with slide transitions is available.

One assumption about the product is that it will always be used on mobile phones that have enough performance. If the phone does not have enough hardware resources available for the application, for example the users might have allocated them with other applications, there may be scenarios where the application does not work as intended or even at all. Also, we assume the devices have sophisticated sensors to meet our requirements of measuring even minute shaking to make the software precise.

The next subsection is design and implementation constraints if there are any constraints that are likely to be faced by the teams for the above purpose of implementing the app we are forbidden to use the camera for measuring the attention. So it is explicitly mentioned that camera cannot be used to capture the students themselves the students might exploit the sensors used to portray themselves as paying attention even when they are not.

So what it tells is that? The attention can be monitored by the teacher by simply utilizing the smartphone cameras present in each student's device however that is forbidden. That is not to be used because the students can manipulate the camera feed and create a feed which look like they are paying attention whereas in reality they are not. So this gives a false positive in cases when the student uses a stand to maintain the orientation rendering the accelerometer and gyroscope functions redundant.

Effectively what it tells is that if we use camera then it may not give us correct results so ideally we should not use camera and that is explicitly mentioned under the subsection on constraints under which the production should operate should be designed and implemented. The next sub section is on assumptions and dependencies that are to be considered while building the product so it clearly lists out what are the assumptions and what are the dependencies.

So we assume the presence of IT enabled large classroom with the availability of a system that can display slides from the instructor to the students along with slide transition is available. This

is the assumption that all these things are available one assumption about the product is that it will always be used on mobile phones that have enough performance. Means efficient performance wise efficient; mobile phone that is mobile phones with good configurations.

Here by mobile phone it is specifically meant to be smartphones because only the smartphones have those sensors that are assumed to be present in the environment. If the phone does; not have enough hardware resources available for the application. For example the users might have allocated them with other applications there may be scenarios where the application does not work as intended or even at all.

Also we assume that devices have sophisticated sensors to meet our requirements of measuring even minute checking to make the software precise. So in order to make the product we require certain prior data and the assumptions clearly list out what we require? We require good quality smartphones having all the requisite sensors. And we also require the existing system which does several activities so that our product can work.

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Then comes the third section external interface requirements so at several level these requirements can be specified first is user interfaces. The software in the device should allow the instructor to have an option note here to have an option to connect with the devices of all the students present in the lecture classroom. The students must also have a complimentary option to

connect to the instructor's device thereafter the instructor should have options getting real-time statistics of the attention span of the attendees.

The UI should be more focused on being organized and work oriented rather than having fancy style and animation the interface should have rigorous error management. So these are some broad level user interface requirements mentioned here of course as we have seen usability requirements can be done at a lower level and we will later see how to specify those requirements.

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3.2 Hardware Interfaces

The students mobile devices should have all the necessary sensors like the gyroscope, accelerometer, proximity sensor with enough specification to handle the task at hand. Also, the devices should have high performance and space to be able to run the software as a background 'Daemon' service.

The instructors device should also have high enough performance to connect to all the users. The network could have enough capability to handle the traffic of the large classroom.

3.3 Software Interfaces

The data collected by the devices carried by the students has to be transported to the device being carried by the instructor. The medium of transport shall be deduced by the design team it could be using wifi, bluetooth or some other wired connection. The instructor's device shall recieve the data from all the student devices.

The system calls required for the communication would have to be invoked. For gathering sensor data the driver modules of the student devices would have to be cooperated with.

3.4 Communications Interfaces

The transfer rate between the devices should be sufficient enough for the instructor to reflect upon the findings of the application. Since the application will be exposed to a limited environment thus the encryption concerns are not humongous.

Next is hardware interfaces what are the hardware interfacing requirements that needs to be specified which is done under this subsection. The student's mobile devices should have all the necessary sensors like the gyroscope, accelerometer, and proximity sensor with enough specification to handle the task at hand. Also the devices should have high performance and space to be able to run the software as a background demand service.

These are some of the hardware interfacing requirements that are specified here the instructor's device should also have high enough performance to connect to all the users the network should have enough capability to handle the traffic of the large classroom. Of course here everything has been mentioned in a very broad level high enough. Now it is up to you in your specification document you can go to more course level and specify exact requirements rather than these high level requirements

But high level requirements are also fine at this stage. Next is a software interfaces list out the software interfacing requirements the data collected by the devices carried by the students has to be transported to the device being carried by the instructor. The medium of transport shall be deduced by the design team it could be using Wi-Fi, Bluetooth or some other wired connection. The instructor device shall receive the data from all the student devices so effectively instruct a device get data from everything in a connected system.

The system calls required for the communication would have to be invoked for gathering sensor data the driver modules of the student devices would have to be cooperated with. So it tells about what we need to do if we want to build the software how to get the sensory data, where to send it, how to send it at a software level. The final interfacing requirements are the communication interface that is also specified the transfer rate between the devices should be sufficient enough for the instructor to reflect upon the findings of the application.

Since the application will be exposed to a limited environment thus the encryption concerns are not humongous. These are some of the things that are mentioned with respect to this particular system now one thing of course you have to keep in mind while going through this example SRS is that not necessarily everything will be required in your case. So you have to take a call on which interfacing requirements you want to highlight and which are not very relevant.

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4 Functional Requirements

4.1 User Class 1: Instructor

1 Start Class Session

ID: FR_INS_1
INPUT: Course name and class group
OUTPUT: Related course page is opened
DESC: Start the application with the details of the current course and lecture.
RAT: The Instructor might be taking multiple courses and lectures involving different students so the application needs to adjust to the circumstances accordingly

1.1 Establish Connection — Instructor

ID: FR_INS_1.1
INPUT: Course administration details
OUTPUT: Connection request to all students present and acknowledgement for the instructor
DESC: Establish connection with the students present currently in class
RAT: Without connection between the devices information cannot be communicated

1.1.1 Real Time Individual Student Attention Statistics

Then come, the main content of functional requirement which can be considered to be the major component of any SRS. Now as we mentioned there are 2 user classes accordingly 2 groups of functional requirements can be specified one is for one class of users. So let us start with the first user class that is the instructors for an instructor what are the functions that are to be supported by the system.

So we have already learned about the hierarchy of functions so we will follow that hierarchy here. Of course when we discuss the hierarchy we used one notation here the notation used is slightly different I will just point those out while going through the functions. So first function is start class session it should be supported by the device by the system. So we should have an id for this function top level function which is given something like FR underscore INS underscore 1.

It should have an input specified course name and class group, it should have an output specified related course page. Now one thing you should note here is although it is mentioned related course page is opened this part of the statement is not required because it is talking about some process rather than an output. So when you are specifying some output you should not mention about the process that this is open this is closed.

Instead you should simply say what is opened here related course page that is good enough whether it is opened or not open that need not be mentioned. So this type of action words is to be avoided in specifying output as well as input. Then DESC remember in the convention we mentioned DESC refers to description. So description of the function is start, the application with the details of the current course and lecture that is the description.

Then rat this short form represents rational as listed in the convention section so one rational part is also added although we did not discuss it in our earlier lectures. It is optional like description so what is the rational for this function the instructor might be taking multiple courses and lectures involving different students. So the application needs to adjust to the circumstances accordingly so this is the rational for this function.

So ideally in any function description all these components should be present. Now under this top level function we have second level 1.1 establish connection for instructor. Now this is

having id FR INS 1.1 again input course administration details, output connection request to all students present and acknowledgement for the instructor. So here like I said you need not mention that connection request sent to all students so sent is an action what you should avoid.

Acknowledgement sent to the instructor again that is sent is action what should avoid so simply you mention this. Then DESC description says establish connection with the students present currently in the class and rational is without connection between the devices information cannot be communicated so we need this function.
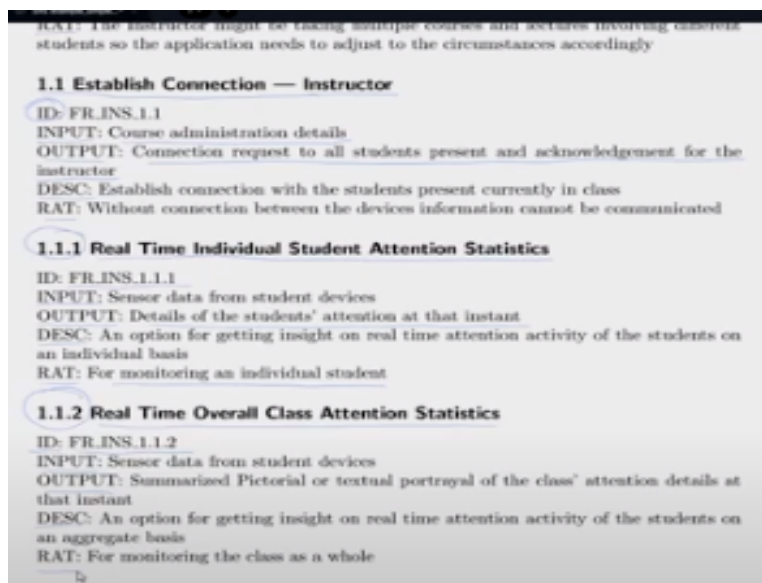
The next function which is under this second level function established connection is real time individual student attention statistics. So by the numbering we can understand where in hierarchy it stands so it is ID is FR INS 1.1.1 input is provided sensor data from student devices output is also provided details of the student's attention at that instant. Description is an option for getting insight on real-time attention activity of the students on an individual basis and rational is for monitoring an individual student.

Then under the same level 1.1 we have another function real time overall class attention statistics with an ID for INN 1.1.2. Input sensor data from student devices output summarized pictorial or textual portrayal of the class's attention details at that instant. And description an option for getting insight on real time attention activity of the students on an aggregate basis and rational is

for monitoring the class as a whole. So here this specification follows the hierarchical notation that we have learned earlier with slightly different conventions than the one we have seen earlier.

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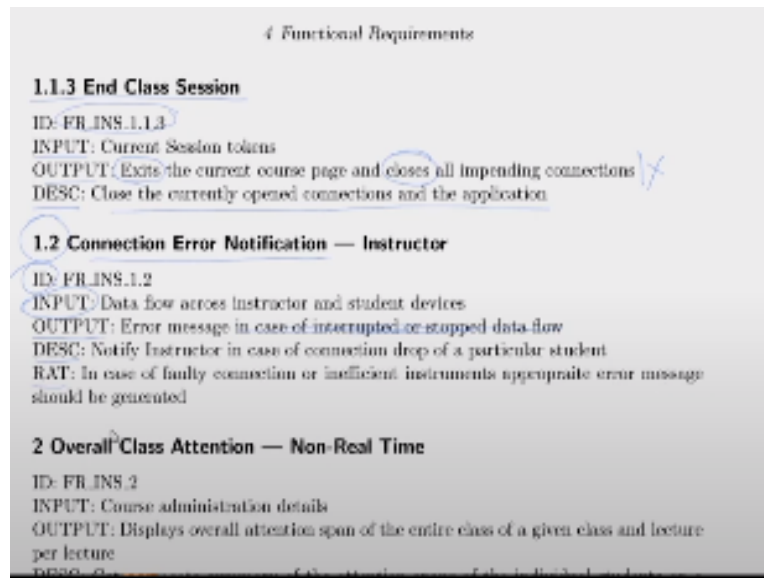
So under, 1.1 there is one more function 1.1.3 end class session with ID, input, current session tokens; output exits the current course page and closes all impending connections. Now here lots of action words are used exits closes so this type of output is to be avoided. So it has to be refreshed avoiding the action word so this is a bad way of writing so in this document I will show you the good things as well as the bad things.

So you should note that earlier things that we have discussed are good things but there are some bad things also involved in this document like using action words in specification of input and output for functions you should try to avoid them. Here description is given as close the currently opened connections and the application. So in description you can use as many action words as you want but in input and output you should be more careful.

Then under the top level hierarchy there is second function connection error notification this is again for the instructor. Having an ID an input specified data flow across instructors and student devices now having an output specified error message in case of interrupted or stop data flow. In fact when you are specifying output you do not need to mention it in this details you can simply say error message. For, whatever reason you do not need to mention here that can be explained in description part.

As done here notify instructor in case of connection drop or a particular of a particular student for whatever reason. And rational is in case of faulty connection or inefficient instruments appropriate error message should be generated that is the rational for this function. So that is about top level function which has 2 sub functions under it one of the sub functions has further sub functions as we have seen.

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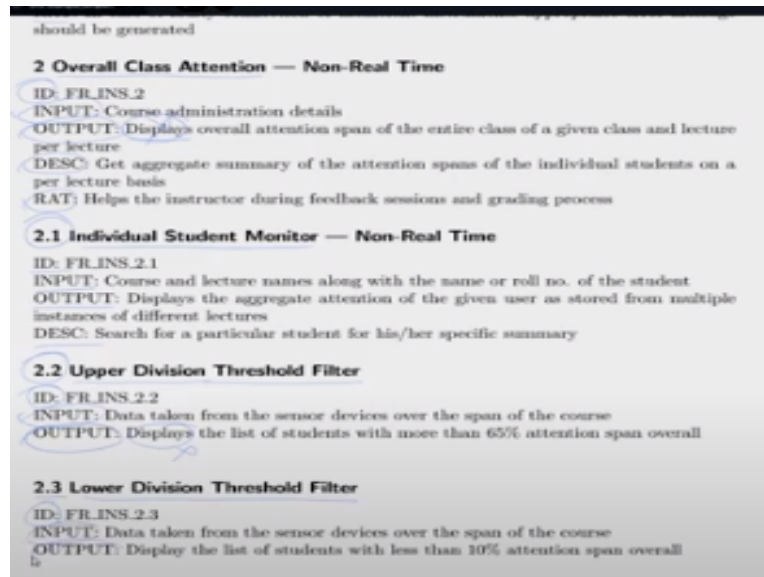
Now second top level function is overall class attention this is again for the instructor it has ID, input, output, description, rational, all specified output everywhere you can see there is this mistake of using action words like displays it is not necessary. You can instead simply say attention span details of entire class or attention span details of a class for a lecture. You need not mention that displays attention class details attention level details all these things so display is an action word we should avoid.

Whatever action word you need to use you can put it in the description part and rationalize helps the instructor during feedback session and grading process. So under 2 we have 2.1 so that is one sub function individual student monitor with ID, input, output and description it is not necessary to provide rational at every function, sub function in the hierarchy 1 or 2 places is good enough for the whole hierarchy.

And as we mentioned earlier also description if it looks repetitive you can avoid because that is optional. So if top level function description is repeated in the lower level function descriptions then it is better to avoid rather than repeating. Like here 2.2 here description is avoided so it is under the top level function of overall class attention level 2 second function under it upper division threshold filter.

One function designed here ID is mentioned, input is mentioned, output is mentioned so no mention of description and rational. Again in output displays word is used which is not a good thing avoid it. Another function under second function is 2.3 lower division threshold filters with ID, input and output avoid action word.

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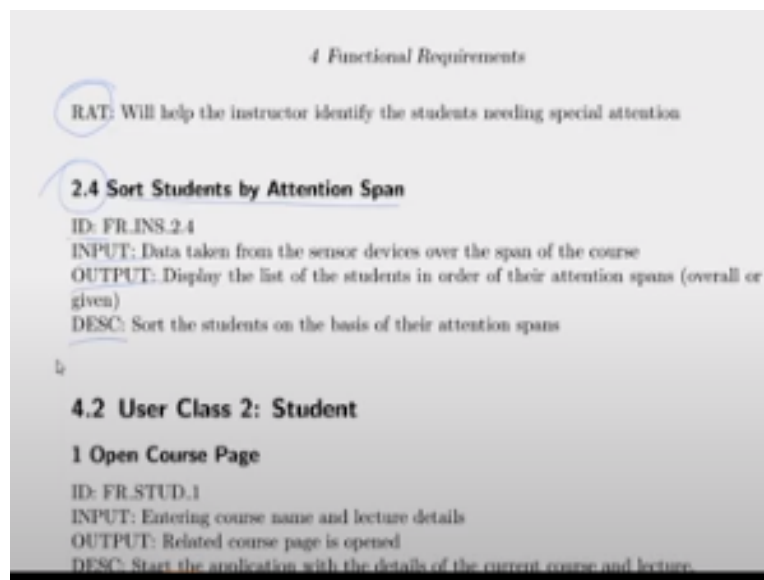
Here again some rational is given rat because it is different from other rational given under this same hierarchy. Then 2.4 sort students by attention span with ID, input, output, description, no rational given. So rational description these are optional but ID name, input and output are mandatory. So that is about instructor class for that class what; are the functions that are ideally to be present in the proposed system?

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2.4 Sort Students by Attention Span

ID: FR.INS.2.4
INPUT: Data taken from the sensor devices over the span of the course
OUTPUT: Display the list of the students in order of their attention spans (overall or given)
DESC: Sort the students on the basis of their attention spans

4.2 User Class 2: Student

1 Open Course Page

ID: FR.STUD.1
INPUT: Entering course name and lecture details
OUTPUT: Related course page is opened
DESC: Start the application with the details of the current course and lecture.
RAT: The Student might be taking multiple courses and lectures involving different instructor so the application needs to adjust to the circumstances accordingly

1.1 Establish Connection — Student

ID: FR.STUD.1.1
INPUT: Course Details and unique token from instructor
OUTPUT: Establish Connection and provide an acknowledgement of the same
DESC: Establish connection with the instructor present currently in class
RAT: Without connection between the devices information cannot be communicated.

Now let us move to the second class of users that is the student so here again like instructor class we can have hierarchy open course page ID, input, output, description, rat. Now everywhere you can see that in this document this mistake has been made that is use of action words in specifying input and output like entering course name not required. You can simply specify as input course name and lecture details.

No need to use the action word then output mentioned that related course page is opened not required then simply say related course page so this you can avoid. Description whatever you need to put in you can put in start the application with the details of the current course and lecture and rational also is given here. Under one there are some subs functions 1.1 establish connection like for instructor with ID, input, output, description, rational.

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1.1 Establish Connection — Student

ID: FR.STUD.1.1
INPUT: Course Details and unique token from instructor
OUTPUT: Establish Connection and provide an acknowledgement of the same
DESC: Establish connection with the instructor present currently in class
RAT: Without connection between the devices information cannot be communicated.

1.1.1 Pause Monitoring

ID: FR.STUD.1.1.1
INPUT: Connection Details of the lecture
OUPUT: Put the connection on hold and provide appropraite feedback message
DESC: Facility for student to pause connection in between to leave the class
RAT: Attending nature's call

1.2 Error Notification Student

ID: FR.STUD.1.2
INPUT: Data flow across instructor and student devices. OUTPUT: Error message in

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Then we have under this function, sub function, sub-sub functions 1.1.1 pause monitoring with ID, input, output, description and rational everywhere you can see that this mistake of using action words has been done. For example here in 1.1.1 in output you can see put the connection on hold and provide appropriate feedback message this is not a good way of writing output. Instead you can simply write feedback message this can be the output rather than this whole process.

Because put the connection on this refers to; actually a process rather than a specific output. Avoid mentioning action words which indicate process rather than output. Then we have description and rational similarly we have under this function 1.2 that is second top level function error notification student with ID, input and rational.

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4 Functional Requirements

case of interrupted or stopped data flow. DESC: Notify the student in case of connection drop.

RAT: In case of faulty connection or inefficient instruments appropriate error message should be generated

2 Student Attention Span Feedback

ID: FR.STUD.2
INPUT: Data taken from the sensor devices over the span of the course
OUTPUT: Results interpreted from the recorded data
DESC: Get aggregate summary of their own attention span
RAT: Helps the student self introspect

Then for user class 2 we have another top level function student attention span feedback having ID, input, output, description, rational everything mentioned as before. So these are the functions that constitute the functional hierarchy for the product so functional hierarchy is the main thing in any SRS document. Later on we will see how usability requirements can be converted to functions and added in functional hierarchy.

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5 Other Nonfunctional Requirements

5.1 Performance Requirements

- The search enabling the instructor to view the summary of a student and give his analysis should be clear and well understandable.
- The program must update the real time statistics at a fast enough pace so that the instructor can have a clear view on the current attention of the class.
- The program must be able to handle the information of the entire class i.e in full attendance almost 90 students and also individually not be glitch in a given mobile device.
- Time to give the error message on losing a particular connection should be minimal (almost immediate).

5.2 Security Requirements

- The students enter their authentication (webmail) to enable access to connection to the slides.
- Since the environment is local i.e limited to the classroom no security precaution or encryption of data is necessary
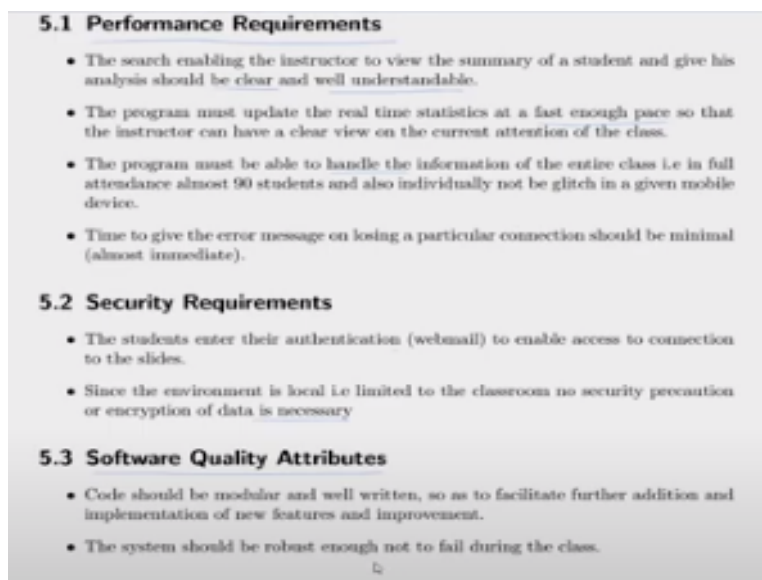
5.3 Software Quality Attributes

Apart from functional requirements and SRS document should also contain details about other non-functional requirements. So here it includes performance requirements, requirements related

to performance of the product something is listed here. Like the search enabling the instructor to view the summary of a student and give his analysis should be clear and well understandable.

The program must update the real time statistics at a fast enough pace so that the instructor can have a clear view on the current attention of the class. The program must be able to handle the information of the entire class a full attendance almost 90 students and also individually without any glitch. So it mentions some size of the full class which is having 90 students but that is of course variable.

Time to give the error message on losing a particular connection should be minimal so it should be fast response. So these are some of the issues that are highlighted here related to performance of the product.

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Then there can be security requirements listed these are all non-functional requirements like the students enter their authentication to enable access to connection to the slides. Since the environment is local or limited to the classroom no security precaution or encryption of data is necessary because it is to be executed over a small area network. Then software quality attributes can be listed out. Code should be modular and well written so as to facilitate further addition and implementation of new features and improvements.

The system should be robust enough not to fail during the class. These are high level requirements non-functional requirements that are mentioned. So what we have learned here that how to create an SRS documents what to be kept one thing you should keep in mind is whatever sections and subsections are discussed in this example document need not be present in every document.

So you have to choose depending on your application area what are the sections and subsections to be kept. Most important component is of course the functional requirements; which lists out the functions that are to be there or to be supported by the product to achieve the objectives. But equally important is also non-functional requirements. Here in this example document only a few broad non-functional requirements ideas are given but in reality it has to be a little bit more detailed.

As we have discussed during our discussion on non-functional requirements different requirements can be listed out. And usability; requirements which is a non-functional requirements has to be listed out in more details than what is shown here. Also keep in mind that some of the usability requirements can be actually represented as functional requirements which we shall see through examples in later part of the course.

Another important thing that you should note is how to write functional requirements because that is the core component of any SRS. In functional requirements ideally you should avoid using action words in specifying input and output. Action words make those look like processes rather than inputs and outputs so that to be strictly avoided. In functional requirement you should have this level identifier name of the function, input, output specified without any action words and optionally.

Description where you can use as many action words as you wish as well as the rational for this function; why we are going for this function? So both description and rational are optional but it is better to keep it in your document. So with that I would like to end this lecture so I hope you got some idea of what is SRS? How it looks? What are to be considered while creating SRS? We will see some more examples in subsequent lectures to understand in better way how to create good SRS'S.

So I hope you have learned the idea of V through this example and enjoyed the lecture I am looking forward to see you all in the next lecture. So we will meet again in the next lecture thank you and goodbye.