웹 소프트웨어 신뢰성

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Six is pretty good.

I think that's initially there were just 3 signed up which was kind of scary.

I do have a question, a question might need to help me.

When I speak this picks me up right?

What about when they speak? 'No' So the audience won't hear them.

Okay. Maybe that's good I mean but I do want people to speak in here so.. but you are not going on that so.. Okay? Okay.

It isbeing recorded for whatever purpose is they choose.

Okay. Today I am really just going to introduce the course.

Tell you what it isabout. Tell what you will have to do. Okay?

I guess the first thing I want to say is in my need of America I talk a little bit faster than this.

I'm going to try to not talk so fast. Do 2 things.

If I'm really talking too slow let me know.

If I'm really talking too fast let me know.

If you have real trouble understanding something let me know.

I can re-explain something. Okay?

It ismuch more important that we communicate than anything else. Okay?

So.. alright. This title..oh, let me scroll down here.

I am going to hand something out to you too.

Alright, there is a webpage is the main I am kind of old-fashioned.

I just have a webpage for the course and this is a print out of that.

And you will see..looking a little bit down on the page.. the address of this. Okay?

And so you can bookmark that.

It isn't linked to anywhere but just bookmark it and you'll have it and all about everything we do will get written about on this page or linked to from this page.

So it isWST 620 page.

If I have any special announcements like I have to cancel class today I might put them there so you want to look at it once in a while and there's a table of contents is just really set of links like the course information.

So my name is Gregg Rothermel..Gregg Rothermel something like that?

And my office is actually.. Okay..

I hang on a lot in the computer science building but my office technically speaking is in this building next to door E2-1.

I should also say where do you folks, where'd you live?

You're in computer science building.

[KI Building] Oh, which? Which? [The third floor of KI Building] Oh, is it called..

Wait a min. You are over the KI building. Oh, okay, KI Building.

You're.. Computer science. KI, computer science, I know that. What building are you.. well..

Okay. You're all over the place.

I.. often times you will find me in Dr. Munjoo Kim's lab in the computer science building on the second floor. 2438.

Probably most of the time that's where I am to be found because this office down here is just an office.

There's nobody there. It islonely.

So if I want to be alone whether I am doing something or I need quite I might be there.

Okay. But the other times here.

But you can find out probably email.

I will put up some specific office hours which you can come see me at.

In for those hours I'll definitely be down there.

So you can just drop in anytime. You can always try to drop in anytime and anywhere.

If I have time I'll see you. Okay? Or you can send me email and so it is.. this is my university of Nebraska.

I am from university of Nebraska Lincoln I should have said that and part of WST program.

So that's my UNL email is one I use and KAIST email just forwards to that.

You know the class hours cause you're here.

You know the room cause you're here.

There's no text but copies of papers will be provided or I might just give you the links cause you all have access to printers.

And we said about what that is.

Now we'll come back to the description of the course and objectives in a minute.

I just want to go through the other stuff first.

There'll be several things that will do in here and in terms of your grade there will be some homework, problem, some paper reviews perhaps some quizzes worth 20 percent of the grade.

You will do a paper presentation that will be 15 percent of the grade.

I'll tell you more about what these are when I go back to the course description.

Class participation I do include that part of grade for that.

This is the research seminar.

I'd like to people to.. to.. will be looking at the papers and I am not going to see through and just talk about the paper.

We all have to talk about the paper.

So I want you all to come prepared to speak about the papers something such as that.

The main part, so that's just 45 percent.

The main part of the grade is based on a project which all have a lot to say about today and the project will include first of you will do a proposal for your project to say what you're planning to do will make sure that that seems like good proposal.

You will end up performing work toward it and writing a paper that's 40 percent and you will end up presenting the results.

So that's where the grade is.

You say, I'll be saying more about these things in just a minute.

Some course policies.

I do expect attendance.

I know sometimes you are going to a conference or something and that's of course okay.

But since it isseminar where we discuss things if you are not here we can't discuss things and if you are not here you can't participate in class.

So I also like you'd be in time as you all were today because later arrivals can be distracting and I also feel like I need to go back and start from the beginning.

I am always supposed to include this.

I hope nobody cheats, I hope you all.

You all know what the rules are.

But if you do, if I do catch you are cheating you will fail. Okay?

Now, there's something I do want you to work with each other on things.

I don't want to think you can't talk with each other to understand the material.

That's perfectly fine. Or re-reading papers sit down together to help each other to understand the paper that's fine. Okay?

Just when there's a product you need to create like writing a review of the paper talk about it with each other then go away and do it yourself. Okay?

Then you are fine.

It comes out of you.

If you learn from talking with each other that's not a problem. Okay?

So what I wrote there was I encourage you to work with each other to understand course material then after you understand the material go complete the assignment on your own and if you ever not sure, talk to me first.

So you don't get in trouble. Okay? I should say any questions just raise your hand or few of us and you can just speak.

I know that maybe not of the Korean way but... Okay? Okay. Alright.

Down below here is a detailed course schedule, not completed yet because in some sense this is a just in time course preparation project for me.

But the start is pretty much certain and so I will be filling this in as we go.

I just put numbers on the left for convenience, the day and date and the topic and if there're slides I will add in a link toward you can find the slides really the slides are just another in the same areas in this stuff.

So and I'll.. my goal is to get these online by the morning before the class I mean maybe not too long well before noon before the class at least for those you'd like to print out the slides you can.

If there are hand outs I will list them here often times out name them and say on the hand out's page cause I don't need to put a link there because that's redundant.

And then if there are assignments I will have them here and you will see today we're going to have assignment for the next class.

So I will keep on doing that but sometimes I write this down and we go faster or slower and I have to adjust some sec in acquired classes.

So you can see the classes, I've written down all the potential class periods.

I guess Chu-Seok is the first and then the national Korea holiday is the third so I don't think we should have class on this day.

So don't worry about that one.

The mid-term week is here as I understand we don't teach in mid-term week so there will be no class that week. Okay?

We do not have exams so you can study, think focus on your other mid-terms that week or your project.

And that's the end of that. Okay? The calendar just list some dates.

There's nothing really to look at there and at the bottom there are links.

The first one is course handouts right now there's just one in there.

It isthe paper I am going to hand out on paper today.

But you can get it from there.

If you do miss a class you'll able to find things there.

The second thing is on course projects. I am going to get to that in a minute or 2 or whatever.

I'll call for papers and some style guidelines so don't worry about those yet. Okay?

Any questions so far? My next thing is going to be what is the course about. Any questions so far?

Okay. Broadly speaking, research on web software dependability.

That's a very broad title.

What is web software? Well, 20 years ago, we didn't have web software, we had software.

We had C programs and fortran programs. And then the internet came about. And then each HTML came about.

And static web pages, and then dynamic web pages.

And now increasingly more and more ways to interact via software that runs on the web.

E-commerce applications.

All the things that run on your I-phone.

So it isexploded in the last years.

The amount of software that is built specifically to run on the web.

And It is that class of software we ultimately interested in.

But it is really broad class.

There's many different types of software that can be described that way.

Dependability. What is dependability? Dependability means. Let me write it.

In a short definition, 'Fitness' for expected use.

You may want to what is that means.

Let me tell you a couple of other terms first.

And then come back to this. So that's dependability.

Another term is 'Correctness'.

We will look at that more formally.

Let's not think about web software.

Well, we could just think about a piece of software.

That runs on your laptop, it does something for you.

We say that software is correct. If for every, I need to back up.

Technically speaking, A piece of software.. (끊기는 부분)

There is no algorithm that given any program can determine whether that program will halt.

That's one of the basic fundamental results in computer science called the halting problem.

And an interesting philosophical thing is, it says that there are something won't be able to solve with algorithms.

There are some unsolvable problems.

One such is does a program halt. Another one is a program correct.

Now for some programs you might be able to tell whether they are correct.

The Hello World program.

It is supposed to print Hello-World. I run it.

There's no inputs. I can tell it is correct.

So I'm not saying that you can judge some things.

And some things you can tell that they halt.

But there's no procedure that for any program I get it.

Can tell me whether program halts.

There's no procedure that can tell me whether program's correct.

And this result comes from basically on indirect proof.

If we could prove that a system was correct, then we could certainly prove that this is would halt.

We know we can't do that.

Therefore, we know we can't do that.

That's little bit of a digression. We're not going to get back to the point.

We're not going to get correct this.

Something we might be able to get is reliability.

Reliability comes from the engineering side of things.

More like, I think, well, that's been around a long time in engineering.

And then a computer engineering they use it.

One either various ways to find it, mean time to failure.

And for given physical objects for beam in a building, given its physical properties, we can say the 'Me in time to failure' is, I don't know the 300 years or something.

Or a bridge 'mean time to failure'.

And there are also ways to do that for software.

And it is very precise and very mathematical.

And In some ways, It is too precise and mathematical to use on systems.

So this is a software less precise term. OK? I

t is not correctness.

Dependability, Fitness for expected use, does not say that it won't fail.

Let's think about, well, Hang on a minute.

Doesn't say it won't fail. And it says nothing about 'the mean time to failure'.

But it does say, how good is it for the use we expect to put it to.

And that use varies a lot of different systems.

The new Mires Lober that just landed.

Obviously that means we're very intolerant of failures in that.

Some small failures might be OK.

But we have a certain expectation of how good it will be in order to be fit for its intended expected to use.

A piece of game software will tolerate as engineers will tolerate some failures in.

If there's too many then we might lose players and lose money. right?

So it really is about how good is a software given what is intended to do.

So it is not a really quantitative term.

But still, it captures something about software that we like.

Now it turns out that with web software.

Some of it can be pretty crucial and some of it less crucial.

And so, we want to be able to insure different degrees of dependability of it.

And that's done as engineers we need techniques for doing that.

So web software is a class of software. There are many different classes.

They have different dependability requirements.

This course is about finding ways to improve, measure or improve how dependable web software is.

And it will differ from different classes of software.

So, I'm not going to read this word for word.

You can on your own.

But, we're going to be looking at research on techniques for measuring and improving dependability of various classes of web software.

Now, we're going to start by looking at techniques for assessing and improving software generally.

There's been a lot of research on that on how do you tests software, how do you analyze it to determine properties of it.

And, at these techniques, we're going to start with those they've served as the basic building blocks for techniques to apply to web software.

So we're going to start with looking at some generic techniques for analyzing and looking at dependability of software.

And well.

This include I'll testing static analysis dynamic analysis you will see what I mean by then.

Then, we will take a look at web software in particular, and start to look at classes of that.

And what sort of challenges for dependability exists for those classes, and how can we address those.

And we hope that some other existing technique might apply there, but there might be new techniques needed.

One particular class of software system that were use, that were interested in is the web soft ware system is the class this that is intend to be used by end users not by professional programmers, So an example of that, what is good example I can do, you might not know this example.

There is one do you think of Yahoo Pipes.

Anyone, I know at least, someone here knows this Yahoo Pipes.

Yahoo Pipes is built by Yahoo company.

It is a programming language that supposedly people who aren't software engineer can use to compose web services.

So, let's say you want it to collect data from several different stock sources.

And then, coreless them to find out something to predict the stocks.

You could ,in theory, use this Yahoo Pipe really to take involves lifting modules putting together and connecting them to show what in put you want to go where.

And the hope was that people without formal training and programming can use that to build with web applications.

So that's the language for use by non-professional programmers and there are other such languages.

So, um, we call this end user software engineering.

And the web brown does provide opportunities for that.

And so that's one class of software that we will end up to looking at.

We will also spend time empirical methodologies in any scientific field.

As supposed to say to math, we are interested in observation of the world and building theories that map to those observations and we built the techniques we want to see how well they work and the world and all of the requires empirical studies such as controlled experiment.

Without studying medicine you are familiar that there are medical study, there is a disease we are trying to treat.

We come up with treatments for it, how do we know what work with experiment with it. Metaphorically, that happens here.

The software we are trying to treat it for a fault and we are trying to find treatments we have to experiment with them.

At least, software is not dying literally, so we don't have to run into ethical problems in what we do.

That's kinds of what we are trying to.

So we will look at how this one do empirical science in this area, how can you if you are going to develop this techniques for improving dependability how in the end can you access them because safer instance you doing a thesis on this, you will develop a technique.

But if you haven't shown that its worth something you don't really have a thesis, the same for a paper.

So, this says no exams, I mention that before. Maybe some short quizzes but the main component as you saw on grading scheme is) course project.

Let's see what I want to do this well and the project as I said is let me a move on to something different.

Course project. Corse project is structured as, as if it were a seminar, how many have you try to publish paper sent them into be published I know you have you gotten one how many have you…there's only one so far but you aware that as scientists we write papers, submit them to the conferences, they get reviewed, we hope they get accepted, if they don't we revise them.

We send them in there's this process. We are going to hold a conference or a symposium.

And this is call for papers for our symposium.

This is one way to structured project I like do this structured project it also gives to you the experience but you have when you submit papers in real life although compressed into this what 15 weeks period. okay?

I will read some of this from the first of the paragraph.

This follow, follow real life this is what you will see WSD6-20 symposium on web software dependability acronym WSD20.

It is a regular form held in Kaist actually it is the first one so not regular yet but regular form held in Kaist for the exchange of ideas and research and development results relevant to web software dependability.

WSD invites you to submit unpublished original state of the art and state of the practice work to share with WSD620 community.

We might broad net too.

If someone else wants to come to this we are seeking papers of wide range of types including research reports, literature surveys or reports about implementations or experimentation.

The primary to finding a characteristic of such papers however as they focus on web software dependability.

Now there's a list of 4 types here experimentation, implementation, research and survey.

I am not go though that now cause I have little more detailed in few minutes to give you but there's these four types.

Participation, the symposium will be opened to all participants who submitted a paper and have accepted.

That's all of you.

Assuming you do submit a paper, if you don't you probably not going to pass course.

So you probably all going to summit a paper, probably is going it is going to be accepted.

And then, you can attend the symposium.

You don't have to pay for this symposium that's another bonus.

Registration is free.

Paper is, this is another time to standard of blurb Paper must be written in English, format Word or Tech.

There're style guidelines.

There is a link of the bottom of syllabus for those, if you use Word fine, if you use Tech fine.

But there are style guideline and templates.

The links limited ten pages.

Other is an exception for survey paper we'll talk about that later.

The Due date is November 26 actually there is a bigger schedule on next page.

Next paragraph talks about what the paper should contain I'm not going to read that.

Look we'll get back to that.

But, the last.. right before presentations the last paragraph is paper will be appeared reviewed.

In the professional community we submit papers to conference and this there is a program committee that they go to and the program committee reviews the papers, writes comments back to the authors and somehow through that which to decides which paper to accept.

And now as author if your paper is accepted, you take those reviews and use them to improve your paper before sending in the final version that appears in the public occasion.

If it is not accepted, you use the reviews to improve it and it is probably use them to improve it and send it somewhere else.

Our program committee is you.

So you are the authors and program committee and often in real life people on program committees most cases can submit papers to their own programs just they don't review them obviously you don't review on your paper and when the papers are discussed you have to go out of room.

But, we will keep things.

Well Basically, you are the program committee and that means that you're going to turn in your papers and for every paper turned in two of you are going to review it.

It will be a blind review, it is anonymous which is all was what happens to scientific world so you will write reviews, give back comments to the author.

And there will be time to the author can take these reviews and improve their paper.

Give them the result.

Okay so, here is what I have for time line for this.

November 26 submission of paper by midnight.

Then the next day, I will take the papers and send them out to reviewers and you will what see.. how was that work we are going to need 12 of you.

Each of you will have to review two papers okay.. and those reviewers will be do I think that's weekend there by 9AM.

I will send them back within a few hours to the authors and then the authors which also includes you can take the reviews use them to improve your paper.

And then finally, you will have that final draft of the paper.

So you got another week improvements on December 10 final draft that you'll turn in and that's your submitted paper.

During that time, you'll also have to be preparing a talk because we'll have sessions in which give you talks.

Where do I have more details on that. well.. I thought maybe we will see somewhere else.

But, in a conference, most of our computer science conference is if your paper accepted you go and you present and typical presentations a lot might be might be 25 or 30 minutes here little be 30 minutes and you talk for 25 minutes use with your power points slides and then you take questions for 5 minutes.

So that's where part of the grade comes from doing this participation. Okay?

I'm the program share.

So that's how we're structuring the project.

Now what you are going to do that's a big question I know but any questions on how we are structuring this in the different components of it.

At least, well ok this misses some this doesn't mentioned proposal that's something we do for the class but talking about that more.

I mean you're responding to recall for papers you're going to do some research, you're going to write a paper, you're going to review some papers, you're going to present your paper.

Yeah, if you'll lose, if you lose that hard copy it is of course available down here, of course call for papers.

So next thing I'll show you is the link from on course projects how many hand you all hard copy of that too but you can find it online.

Okay, as you've seen it earlier I listed 4 types of projects and there's research, survey, implementation, experimentation.

Actually most of these most of what you do would contain components of each of these I mean it is for instance most research projects might contain and might require some implementation and some experimentation.

But, more about that in a minute.

What are these 4 categories? And I'll sort of read from this and discuss as we go.

Research involves formulating and offering a solution to a problem formulating a problem and offering a solution.

So, for instance, how do we test JavaScript I think through someone interested in that in here.

Okay that's a problem.

There's a JavaScript program how do we test or detail process diagrams how do we verify things about that. Okay?

That's a problem and you find a solution how do we put away to verify.

Obviously, people, on many projects people spend a year or two.

This, your project, it has to fit within the term or little less than the term so it has to be well defined, but that's what we work on.

A survey is a different type of thing and surveys are useful well let me see what they are.

The survey starts with a literature search for this class sorry, for general survey in a certain area likes say you wanted to all the work done on I already used this testing JavaScript. Okay? You'd go out and you'd do a literature search everything written on that.

And you'd find a way to understand it all and first you need to be able to report back what's done but, hopefully you can do more cause it is just a report well so on Johns did this and Herald did this and that's not super-useful you'd like to take that and say something more such as these are the problems they've defined, these are the ones they've worked on, these are the ones they hasn't been worked on now we are

getting somewhere.

Okay? Or solutions can be characterized as ones that work this way or that way.

You add something to our knowledge what's been done in that way.

So survey starts with a literature search.

For the purpose of this course, I'm saying you can choose 6-8 resent papers that seemed to most relevant and study them in depth. Okay?

The goal is to see where work has been done, classify the types of problems and the area.

Report on some of the work done on those problems and point out where future work is needed.

Now although I've said focus on 6-8 papers I do expect a complete bibliography of the work in the area.

So there's an area where has been a lot of work you might have a long of list of references, but you can focus on a subset of those for your real studying.

Third, implementations, implementations involve taking an existing algorithm and implementing it as a prototype tool.

I'll just skip that next sense.

It is a short period of time when we are not really taking something efficient usually in research our first implementation is a prototype it is something that's meant to achieve some functions so we can look at it but it is usually a trial.

In some cases, you may mean to integrate wasn't existing tools actually in many cases you may need to in these days you may have to learn something about that.

I did write if you do an implementation in addition to describing it in a paper you will turn in your code to me within an instruction on how to build and run it. Okay?

Finally, experimentation involves taking the existing tools maybe collecting some experimental subjects what do I mean by that.

And if you are again texting JavaScript and you've got a technique you've developed for testing JavaScript well you need to have some JavaScript programs to test it on.

Okay? So you might need experimental subjects and you will going to perform experiments with those testing some hypothesis the simple one is my technique better than what people currently use.

Get so much more sophisticated than that.

I'm leaving very simple examples.

Umm… I won't say any more about that, that something you can reread when we really get ready to start these then you're thinking about to find projects will go through this again and more detail.

Now, I mentioned that often time things involve both if you develop an algorithm it would be nice to see a little bit of data about how well it works.

Again we will constrain in the time. Okay, so it is important that we sculpt things to how much time we have.

But in many cases if you developed new solutions of problem, it would be nice to see some early preliminary data on it which starts to move toward experimentation.

A survey could be just a survey you could do some work that had a survey and some element in experimentation comparing a couple of the techniques I just want to say don't feel like it has to be one of these four you can combine things and in real life research papers do combine this.

Most successful research papers that had algorithms have a related work's section which isn't really a survey but it does involve knowing what's out there.

Involve, yes someone implemented the algorithm and someone gathered some data on it.

Some most your research papers contain all 4 of these components.

But, there are some papers that focus more on others.

There are among research papers there is research papers that are far more the new algorithm and just a little data and the research papers that are taking existing algorithms no new ones and just doing experiments with them and there are some not so many but some papers that just survey the literature.

There is, to be honest, there is almost no implementation papers usually if all you've done is implemented something that one get into a real research conference.

Unless the implementation serves the purpose on the experimentation so it has to be careful with implementation projects here that they are not just "Oh I implemented this." Okay?

Now, so that's what you have to do except hide the hard part here is for you to deciding what type of project and what type of thing are you going to work on.

So, on the next page I've given some examples of past projects.

These are not related to web software dependability they are related to or they could

be someone could have applied these.

Now, they take that back they are not now. Okay?

But there is an example of each of these classes.

So other example of research one, I don't want to read through these I will let you read through these. Okay?

But do read through them and even though we'll talk about it more, later before the next meeting read through these cause I want you to start thinking about these right from the start.

Cause you will going to have to come up with the topic and that's going to.. and the topic cause going to relate to the type of project that you do and you are finding a new process it isprobably new research.

So read these examples and they give examples of things people actually have done in the past.

Umm, for a projects.

Now let's see a few things about that.

How may I do I. Okay.

One thing I should tell you is that I've tried done this of courses like this with this structure several times in the past now never on the topic of web software dependability but often times the work people do does live them into a research topic that maybe becomes their master's thesis and maybe results in a published paper or even if it is not the master's thesis, it results in the published paper.

Doesn't have to but it can. OK? Some of you…. I want to go through into… How many of you are MS students? Just… Just…. Ok. And Ph.d? or... Ok.

And How many of you have chosen a topic for your thesis definitively you started.

Aha! Okay. Okay.

I think I think you are closer to it.

One thing this can do is to give you an opportunity to explore a topic.

You know, in a relatively none threatening.

I mean you got to do something for this course.

Well you can explore something you might be interested in and if it turns out that you are not, well you learn that Ok? Or maybe this turns into the basis for your topic.

That's great. So use it as that opportunity.

If.. I know some of you at least are starting on thinking about particular directions to go.

You are perfectly welcome and I did encourage you to explore that here in this class.

Unless you really want to try something else.

I mean if your topic is testing job or scripts you bet I know someone whose topic might be that here… and you might do that just for this class OK? I don't care it overlaps with your MS work.

I mean I think that's great. Use this if you can in ways to help you with the stuffs you doing outside.

It is perfectly fine. I thought I had written somewhere but I haven't found it yet.

Course projects yeah…. Is it on.. this page? Yeah Yeah I did have it written back on this course descriptions.

Basically you said you will need to select the project.

Share your discoveries by writing a paper and presenting your result.. results.

And a past several have provide the basis of subject of papers.

Dealt this with considerable latitude choosing projects.

It is often possible to do one that leverages or integrates well with other research you are doing.

Last thing I did not discuss is the initial classes here, I'm going to be talking about as you saw here, some specific existing analysis in testing techniques.

So those will be.. well lectures but I'd like to have them be interactive as much as possible.

After that, things won't be so much lectures as a… well we will be taking about papers.

Research papers… that pertain to current research on web software dependability or on other analysis techniques and some of those I will project the papers but you all of read them.

And all those I expect you written the paper review just a page or so.

So that you have thought about the paper and we want to talk about the papers.

When we get that, I will say more about talk about what I want to be prepared to talk about.

But much of that is about look reading papers and discussing them.

And learning from them.

I'll ask each of you to in class present a paper yourself.

And you will be able to choose the paper with my OK.

And develop slides on it and present it.

You will have seen me do some before that.

You will see what I have in mind,. And here too.

I'm happy of…. in fact, I think it isthe best, if the paper relate(s) directly to your projects.

For most your projects you are looking on the particular topic.

There is going to be… something that is closely related to work on this paper.

That's a good one to present.

You have to know it anyway. You are going to be an expert on it.

You can tell us about it. So that's the things that goes on there.

The other thing I guess I didn't mention is… looking at this.. looking at this stuff.

Let's go through this again.

There will be some problem sets in the early stage when I'm teaching you some analysis techniques.

I'll give you some problems to solve.

The only way to understand this algorithm is to go through them yourself.

So that's to help you understand them.

And when we start reading papers you will write a review on the paper.

I don't mean.. I don't mean many pages just something to make sure you thought about it.

I may or may not do this.

If I do it, it is20%.

And then your paper presentation that I mentioned it is the 15% and the one thing and we talked about your projects presentation.

When we get going on this project I'll ask you to do a project proposal.

And that doesn't need to be too much either probably just a couple of pages.

But in that that's.. and then, we can work together on this but when we get into choosing projects, I want you to write up proposal for … again we will go through this later but want to for shadow it.

The problem of doing X is the big problems.

Existing techniques don't deal with it from this stand point, in my project I'll do this.

And there should probably be some sort of time line.

The biggest reason for this is well there's two reasons.

I want to make sure that the project you are doing is sufficient that is large enough.

If it is too small, it is not going to be sufficient for the class.

I also want to make sure, it is not too large.

We do only have limited time in here. On many projects, there's a way to scope them.

For instance, there are certain techniques for testing software where the first work on those techniques they are not for testing but for debugging where the first versions of technique when they wrote the paper on them.

Dealt only dealt with programs that contained only if and whiles and no go tools and no jumps.

But that was sufficient for the papers.

So scoped to that.

In an empirical study I don't expect to you go out and study 5 industrial Samsung applications.

You got to scope it to something you can do in this class.

The proposal helps us look at this and make sure scope to something that can be done.

But that is sufficient. OK? Any questions on anything so far.

So for next class.

This is something I put together that it is not a published thing at all.

It is just for use in class.

It talks about something very basic techniques or what we call analysi… representing and analyzing software.

For instance, you can take a piece of software and represented it as a graph.

You can apply graph algorithm to it to do various things and we will see that's what several early techniques did with regular software systems since then people have applied these techniques to start in to web software so you need to understand them.

And themselves Ok? And then analysis techniques operate on usually representation of software to answer questions about them.

For example, can this software enter a dead lock state.

It turns out there are some classes of software you can ask that on.

We will looking at that more I won't give any more examples.

This was been. Well next few classes will be about pieces of this.

And as you will see here, for next class Thursday, I'm asking you to read Sections 1 and 2.

And you see that what 3 pages, so only few pages.

There is an algorithm here algorithms are little bit dense you trying to understand the algorithm we are going to go through it in here.

Make sure you understand it.

And if that doesn't use up the time, I may start looking a headed something but that's what I want you do for next class. Will be… Probably the most basic analysis techniques that you need to know many others depend on it.

Other things will do, well look at the other analysis techniques in here, and we start to look at hm.

Well then we apply the couple of classes basic testing and verification methodologies and then we will start to looking at work and done specifically on web software in validation and verification.

I think that's just about all.

I'm going to down to the end I probably should have done this in beginning I got your names here, but should I ask, all do introduce yourself.

Because.. I don't know you.

Maybe don't know all of you each other everyone should…

Well.. I don't know but why don't you just introduce yourself one by one and the let me turn this off here for second before we start this hmm how am I do that screen, projector off.