IIT Madras

ONLINE DEGREE

Computational Thinking
Professor Madhavan Mukund
Department of Computer Science
Chennai Mathematical Institute
Professor G. Venkatesh
Indian Institute of Technology, Madras
Concept of Message Broadcasting

Professor Madhavan Mukund: So, we were discussing what we could do with these objects. So, one of the things we said was a train could ask a station, whether the platform is free. But in general, we could ask a station, I mean, not a train. But from our perspective, also, we could ask the same thing to each station, we could say, do you have a train waiting at the platform at the moment or not?

Professor G. Venkatesh: Each station you have done?

Professor Madhavan Mukund: Yeah. Now, this is a point, so now we have to go through all the stations. So, even if we have this idea of concurrency, we have first asked the first station, then we have to go back ask the second station. So, we have to call this some however many stations 100 times. And the same question

Professor G. Venkatesh: Same question?

Professor Madhavan Mukund: Same question. And we want the answer now.

Professor G. Venkatesh: So, here was the trains…

Professor Madhavan Mukund: No, but also the other problem by the time asked 100th question, some, maybe some 2 minutes have passed. So maybe in that time, the train the information I got about 100th train is not the same as the information I got about the first train. So it would be nice to be able to just send this,

Professor G. Venkatesh: To all stations.

Professor Madhavan Mukund: Yeah we were just want to say,

Professor G. Venkatesh: I am not saying to one station, I am saying to all stations.

Professor Madhavan Mukund: Yeah. So, it is like you have a siren, which goes off

Professor G. Venkatesh: I am saying to all stations like this circle you said like

Professor Madhavan Mukund: Exactly. Everybody report back.

Professor G. Venkatesh: All classrooms. You said one circular to every class.

Professor Madhavan Mukund: Yeah.

Professor G. Venkatesh: So, put it in the notice board, something like that.

Professor Madhavan Mukund: Then everybody has to report back their answer.

Professor G. Venkatesh: This is broadcasting?

Professor Madhavan Mukund: Yeah. So, we are broadcasting this question. We are not, we are not asking you to any specific station. We are just putting it out as a message to everybody

Professor G. Venkatesh: Crazy, a procedure call means basically, you will call an object procedure, not it is not like that.

Professor Madhavan Mukund: No, so this is, yeah.

Professor G. Venkatesh: So, you made a call, you made a general call? Not to anybody.

Professor Madhavan Mukund: Yeah. So, you are asking for some information? In this particular case. And the information is

Professor G. Venkatesh: Anybody can answer it.

Professor Madhavan Mukund: Everybody should answer it. Anybody also could answer it. So, there could be two different ways of doing this. So, in this case, we are asking every station to report whether or not…

Professor G. Venkatesh: Broadcast just say whether you want to answer for everybody or for one person?

Professor Madhavan Mukund: Or you decide what you want to do with them. So, for instance, you might have a broadcast, supposing you need something. So, you say you have an emergency at home, and you need to mop up some water. So, you might send out a broadcast on your

building WhatsApp group saying anybody have a suction mop? And if anybody says, Yes, you are happy, do not expect everybody to have it.

Professor G. Venkatesh: One person is enough.

Professor Madhavan Mukund: So here, you broadcast it, and you interpret the answer. So, everybody tells you whether they have a train station, train waiting in that station or not. You decide what you want to do with that information.

Professor G. Venkatesh: So, broadcast, but when there is some crazy thing, now procedure call, even when needed remote procedure call with this producer consumer model? We gave it a tray, then that guy specific tray for him, nobody else. Physics teacher has his own tray, Chemistry, And then the guy who was supposed to put his result? Because that is the otherwise you do not have any sanity…

Professor Madhavan Mukund: Yeah, because you do not even know who these stations are now, since you are not addressing it to anyone.

Professor G. Venkatesh: So, if I broadcast something first of all the other guy should know that these broadcasts are coming. So, you should be looking somewhere for…

Professor Madhavan Mukund: Correct.

Professor G. Venkatesh: Second is that they should know where to put the answer. So, there should be some agreed method of putting the answer back.

Professor Madhavan Mukund: So, maybe they could have a tray for this broadcast.

Professor G. Venkatesh: Firstly, there is a broadcast so everybody knows that there are going to be broadcast. So, they keep they there is a tray which they look for. Every station is looking in some tray to see whether or not there is a broadcast today.

Professor Madhavan Mukund: Correct.

Professor G. Venkatesh: That is one thing.

Professor Madhavan Mukund: Last the notice board or whatever it is.

Professor G. Venkatesh: Notice board or if we do.

Professor Madhavan Mukund: Or like in an email or an app, the notification, you have a new message.

Professor G. Venkatesh: You have a new message or something.

Professor Madhavan Mukund: So, then they have to go and look up that message.

Professor G. Venkatesh: They will go look up the broadcast, they will go up there, they get a notification, they go look at the tray, broadcast tray. And if they find something sitting there,

Professor Madhavan Mukund: They have to decide how to send the answer back. That is what we are discussing.

Professor G. Venkatesh: So, this is some shared tray I guess.

Professor Madhavan Mukund: Yeah, so maybe I am saying so maybe this depending on who has sent the broadcast. Each person who sends a broadcast has a single

Professor G. Venkatesh: Shared tray

Professor Madhavan Mukund: Shared tray for everyone to put the answers.

Professor G. Venkatesh: Everybody share that tray. Lot of concurrency okay, everybody is there but then they have to say who they are? People

Professor Madhavan Mukund: Yeah, they have to say because it is not useful to know that one person has a mop unit. need to know who has that Mop?

Professor G. Venkatesh Yeah, correct. You know where to pick it up. So, the guy will say, Hey, I have station Adra and I have a station train

Professor Madhavan Mukund: Waiting right now.

Professor G. Venkatesh: Numbers of the waiting right now in me. He has to say that, so he has to identify himself. And the answer and he will put it in the tray, in the common tray.

Professor Madhavan Mukund: This answer tray.

Professor G. Venkatesh: It is not a Physics tray, Chemistry tray, Math's tray. It is one tray.

Professor Madhavan Mukund: It can hold a lot of information because every station potentially,

Professor G. Venkatesh: Every station potentially try right to do it.

Professor Madhavan Mukund: Yeah. So, I of course, we have the old problem of reading and concurrency. So, we will assume that this so we have one common answer tray.

Professor G. Venkatesh: One tray only broadcast answer tray. Everybody tried to…

Professor Madhavan Mukund: And everybody is trying to write into it. And we had this old problem that we must have Atomic.

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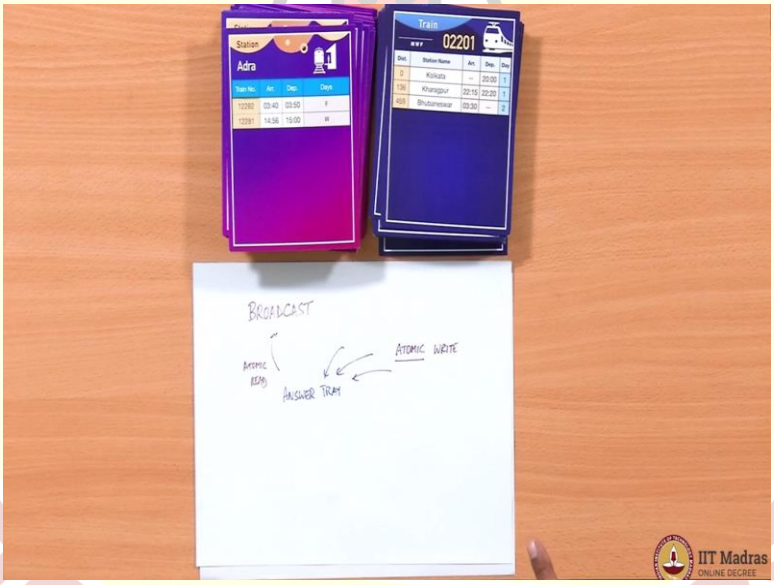

Professor G. Venkatesh It should be atomic, only one guy can write at a time and one read only at a time. Two people cannot write at the same time, there will be a huge problem otherwise.

Professor Madhavan Mukund: So, both read and write from this. So, the broadcaster will look for the answer there. And when is looking for the answer, nobody should be writing an answer. And when somebody writing an answer, nobody else should be writing an answer. And nobody should be reading an answer.

Professor G. Venkatesh: You wait for some time keep collecting answers after some time out and say okay, I think I got enough out of responses. You can process it.

Professor Madhavan Mukund: Yeah, right. Correct so, supposing he is waiting for five objects? Five answers. So, then you can decide.

Professor G. Venkatesh: Or we wait for 5 minutes or 10 minutes something? Yeah. And then after that, we will see what our answers are there accordingly we will make a decision. These are the train stations where the trains are waiting.

Professor Madhavan Mukund: Yes.

Professor G. Venkatesh: This is cool. Because this way, broadcast nice, because this way, I do not need to tell each station.

Professor Madhavan Mukund: Correct.

Professor G. Venkatesh: One by one. One message I sent there. That is all.

Professor Madhavan Mukund: Yeah, and whoever is there will get the message and that is it.

Professor G. Venkatesh: And then they will respond in a comment place and than done. Very nice. But in the case of trains, it is tougher no because train station is always there.

Professor Madhavan Mukund: Correct. So, trains have different lifetimes. So, when you send a broadcast at a particular time,

Professor G. Venkatesh: Suppose they want to ask the train. I mean, I would not ask the train.

Professor Madhavan Mukund: Are you running?

Professor G. Venkatesh: Are you running? Yeah.

Professor Madhavan Mukund: So, some of them will say yes, and the others would not respond, because they are not running or will they mean to train these objects? Are they always…

Professor G. Venkatesh: They are not there.

Professor Madhavan Mukund: Because…

Professor G. Venkatesh: The object is not even there. So, you have a possible station that the train so if you do not get anything for some trains you do not get any answer at all means the object is not there. But if the train is alive which is running elements that the object has been created then it should respond either yes, I am running or it should say No I am not running. Something like that it should say. It cannot just say I am running and if it No I keep quiet because if you keep quiet then.

Professor Madhavan Mukund: You do not know if the object has been created or not. Yes so that we have to assume therefore this broadcasts will actually reach every object which is created…

Professor G. Venkatesh: Alive.

Professor Madhavan Mukund: Which is currently exists, exists and they will all give an answer

Professor G. Venkatesh: Give an answer they will either say yes I am running or no I am at rest I am stopped at this point in time. And so, you will get an answer if you look at your train, put train on after the broadcast you will see number of trains have responded these are the trains which are.

Professor Madhavan Mukund: Alive.

Professor G. Venkatesh: Have been created. Some of them will say yes, I am running some of them will say not I am not running. So, you know the answer. But this is cool, this method is much better than other is what I have to do Firstly, I do not even know which are the trains?

Professor Madhavan Mukund: Yeah, so you do not know…

Professor G. Venkatesh: How do I call them?

Professor Madhavan Mukund: Because you have to address a procedure to each object. First you have to determine whether the object, so this is kind of indirectly telling you which ones are there.

Professor G. Venkatesh: If I want to do otherwise that I have to ask each class, have to go to the classes, train classes and say hey which are the objects you created? Then he will give me some

objects. Then I have to call each of those objects and say, Hey, are you running? Such a painful thing? I can just broadcast, broadcast is so much better.