Simulation of Business Systems
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Lecture – 11
An Introduction to ARENA

Good evening students, welcome to the another lecture of Simulation of Business Systems course. And today unlike the normal lectures we are going to get exposed to a particular popular simulation software called ARENA. Up to this point we have been focusing on understanding the need of simulation, what is simulation, what are the business problems or business systems that can be studied using simulation different types of simulations and what are the business decisions that can be modelled using simulation; what is a model, what is a system, what is an environment, what is a boundary of a system and it is activities; all those details that are related pertaining to a simulation was studied in our course so far.

Also we have seen there are multiple ways to build a simulation model; one of it is to use a general purpose programming language like C, C plus plus etcetera. Another option was used specialized simulation, programming languages like SIMSCRIPT Simon SPSS etcetera slam etcetera and the third option was used specialized simulation packages software packages, which allow you to build models. The as I said earlier, building the simulation model is an art and as well as a science. So, you require appropriate tools to do it. And in today's lecture what we are going to see is one such tool called ARENA. ARENA is a simulation package is not a simulation language it is not a general purpose language it is a simulation package made by Rockwell software and there is a simulation programming language underneath ARENA which is called Simon ok.
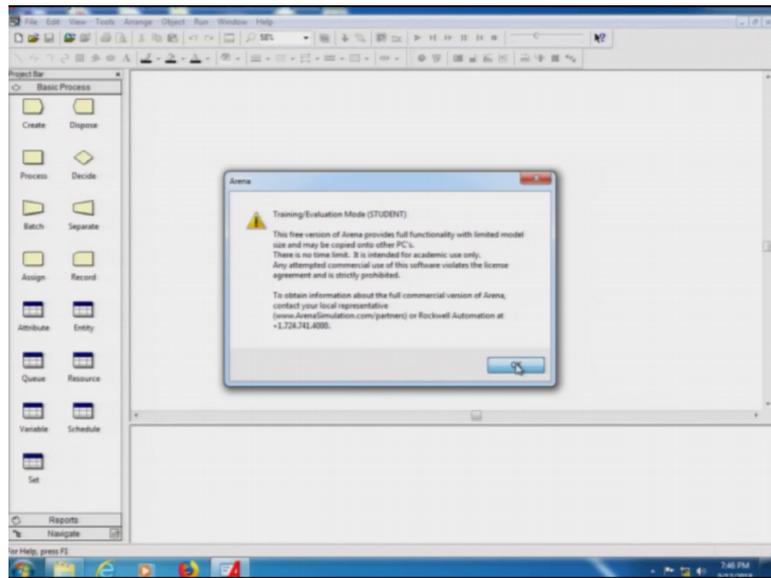
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So, if you look into the desktop you will actually see that ARENA typically is appears on the launch bar of windows, by the way ARENA is a window software it is not available in any other system.

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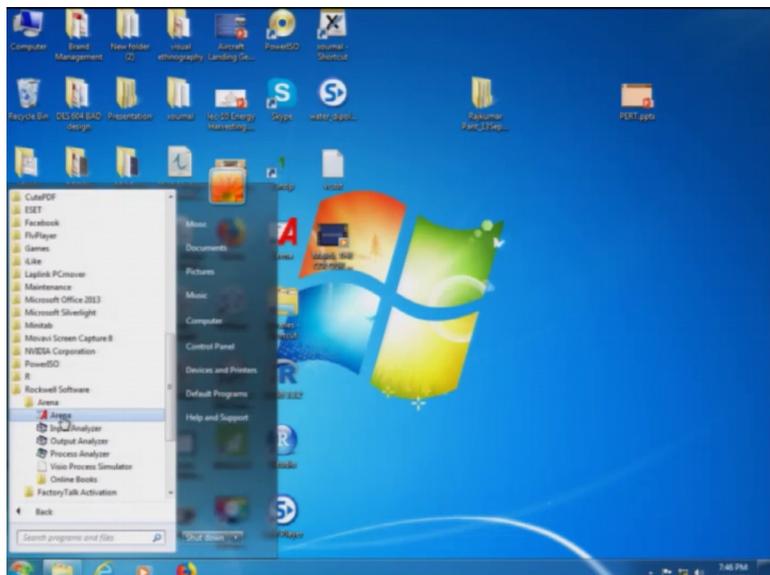
There is other thing is if you go to all programs and if you go to the Rockwell software, there is always a tab called Rockwell software, typically it is the scrolled down to R you will see Rockwell software, you click this you will see got a lot of details and in which you will see a folder with ARENA named on it, you click the ARENA folder you will see input and out analyzer output analyzer process analyzer etcetera and you will also see a icon of ARENA.

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So, what you do is you click the ARENA icon and the software launches; and a message comes out that is a training and evaluation model or a student version of ARENA which is available from the Rockwell website ok.
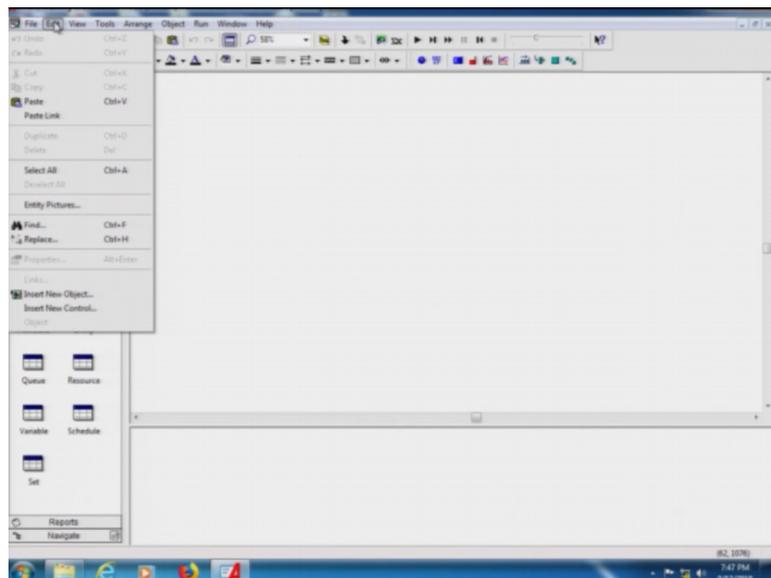
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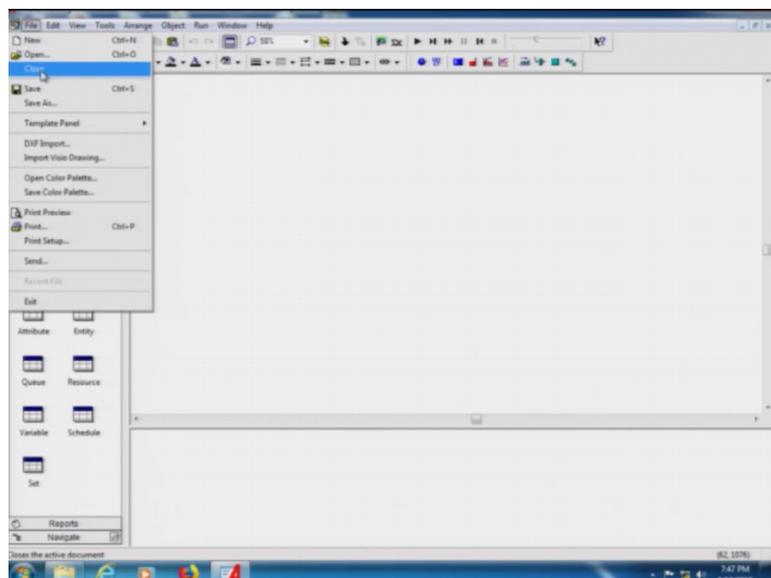
So, you click ok with that and it goes away and this whatever you see now is the graphical user interface of ARENA or this is a simulation software package that provides GUI ok. GUI stands for Graphical User Interfaces and this GUI allows you to actually built models. So, this one if you look into this, this GUI is a Microsoft window you can

do into different sizes you can customize it into the size that you want, all those kind of things typically whatever you do if you do this then you can reduce the size of this by holding it one side and dragging and doing all those kind of things. Anyway we are going to look into so full screen model. The major things that you need to look into is on the top is the different options you have the file options, which allows you to save open a new file print and those kind of aspects.
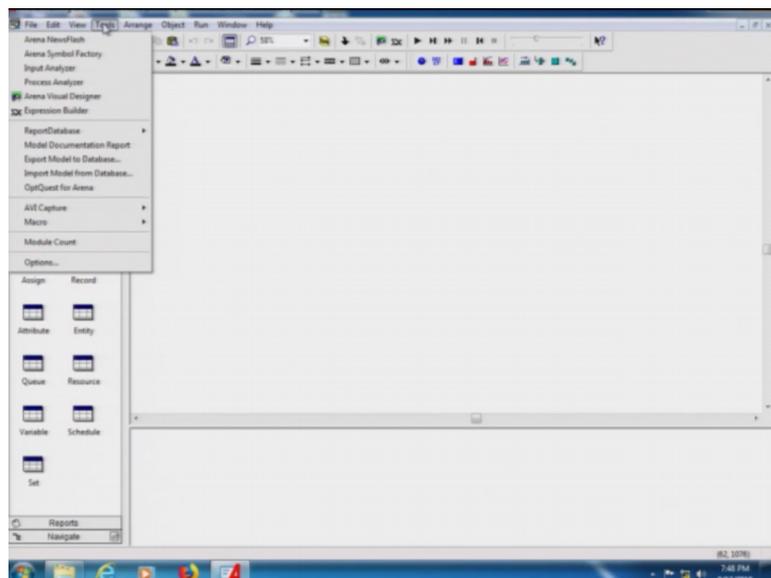
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Then there is the edit, which allows you to do the copy paste and all those kind of other aspects along with this.
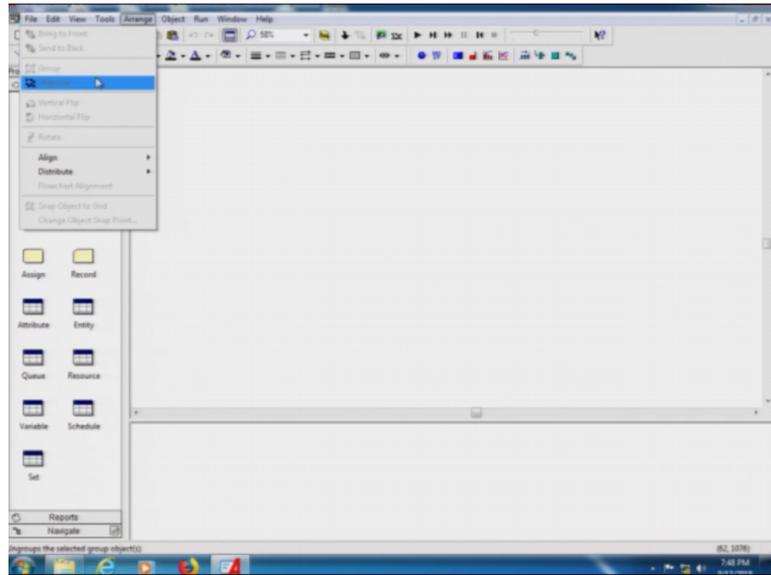
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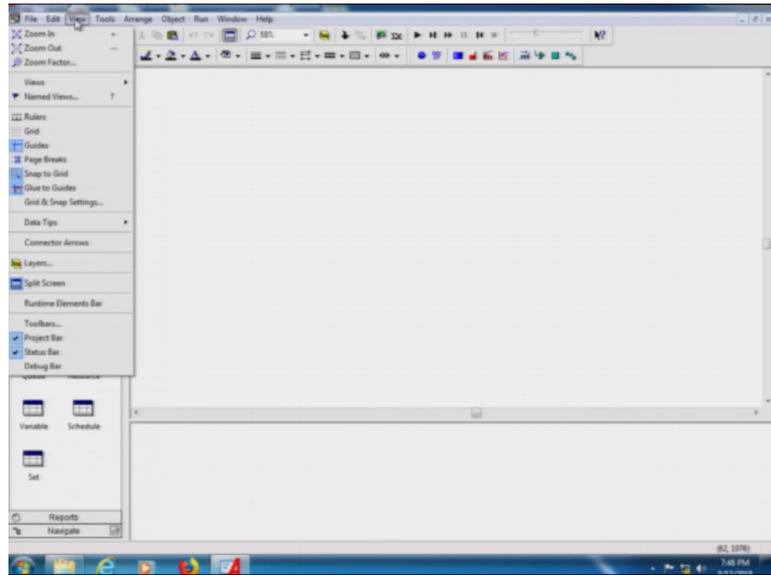
Then the view is allows you to zoom in zoom out of the models, it allows you to show the grades and all those other aspects which I will show in a minute.
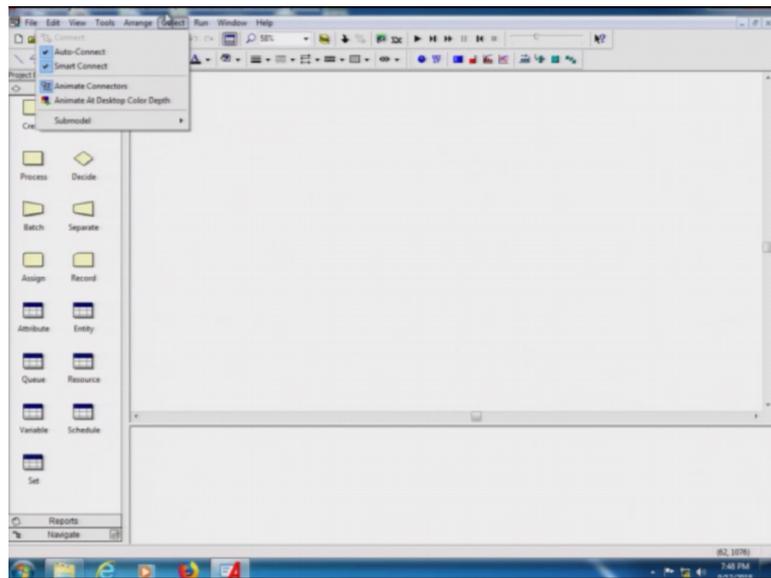
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Then there are other tools, which is the input analyzer, process analyzer, output analyzer report database opt quest; opt quest is the optimization package for ARENA to optimize a business model.
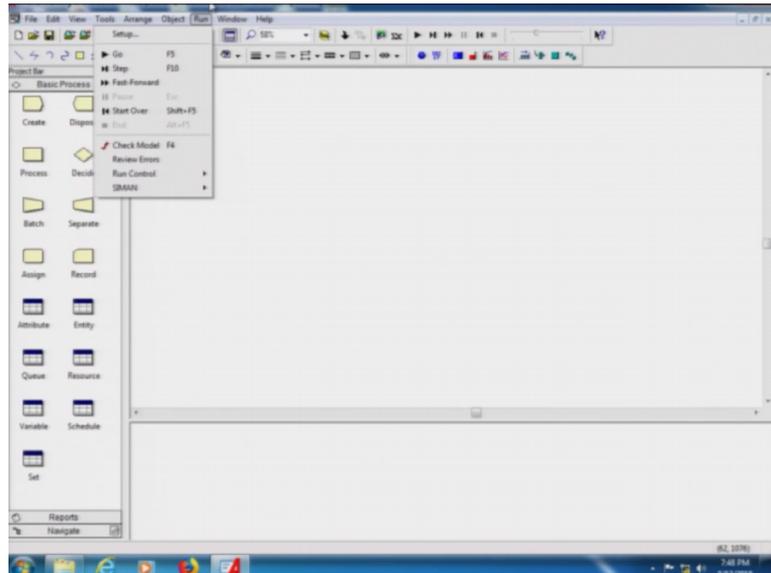
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Then you have the arrange options, we will see how to group and ungroup got a lot of things in this regard.
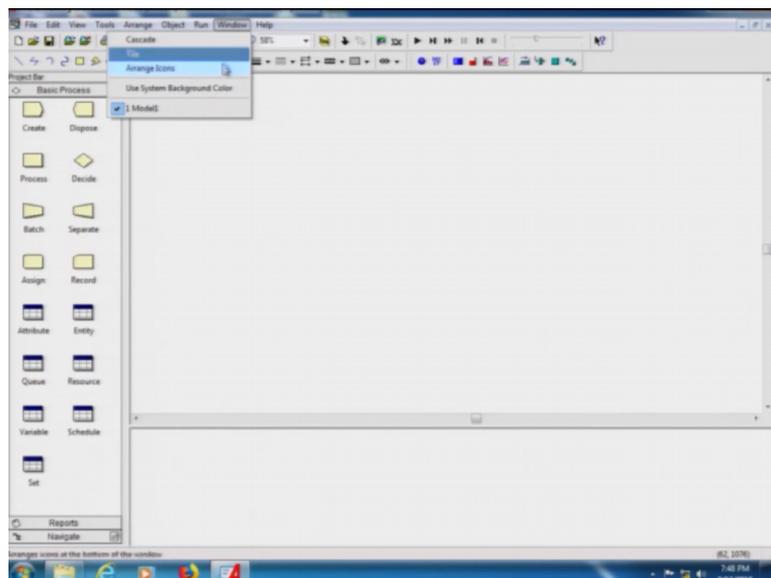
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Then there is this object, in which the auto connect and then other aspects are smart connect are given there you can unclick if you want to, but I will show you what it is.
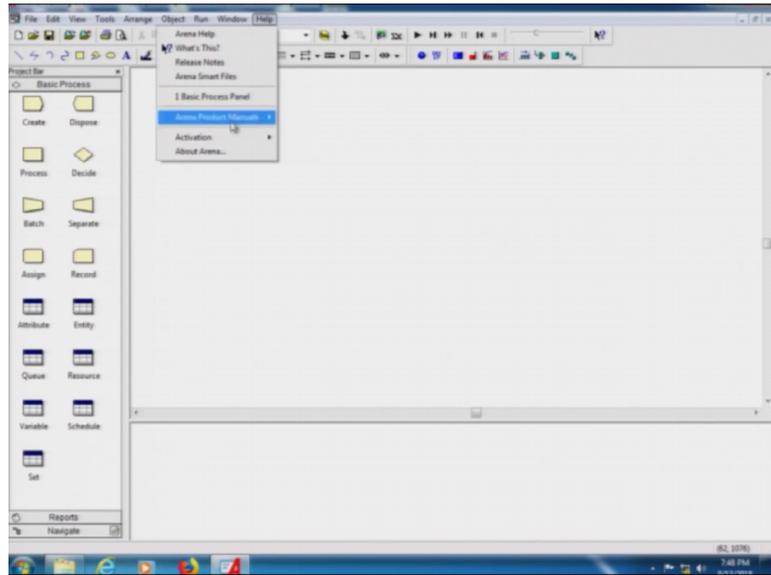
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Then the run is, how to use ARENA software package or how to use your model to do experiments that is done as part of this run setup.

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Then you have the window, where you allow how the window and other things is. Typically when you opened screen is created for you and then you have the model aspects of it.

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And then there is the ARENA help; basically the help notes and other things that are related to ARENA are available here.

So, some people like working on blank space. So, this space that you see here, this particular space the white space right here is where you build the model. And different details of the model different processes activities, entities, whatever is pertaining to the model that you building here they will be listed in the bottom window ok. So, this is the model window and this is the detail of the individual aspects of the model will be shown right here. And the one that you see here this option is where the different components that you can use to build simulation model is available in this area.

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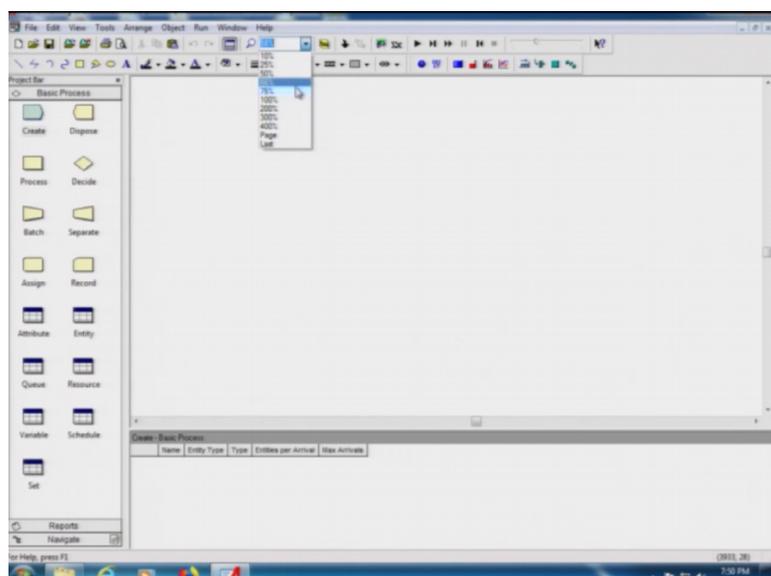
So, you have the create module, the minute you click the create module you can see that the details are available right here, then we zoom it up a little bit more so, that you can actually see it better and view you can always say zoom in it allows you to zoom things better.

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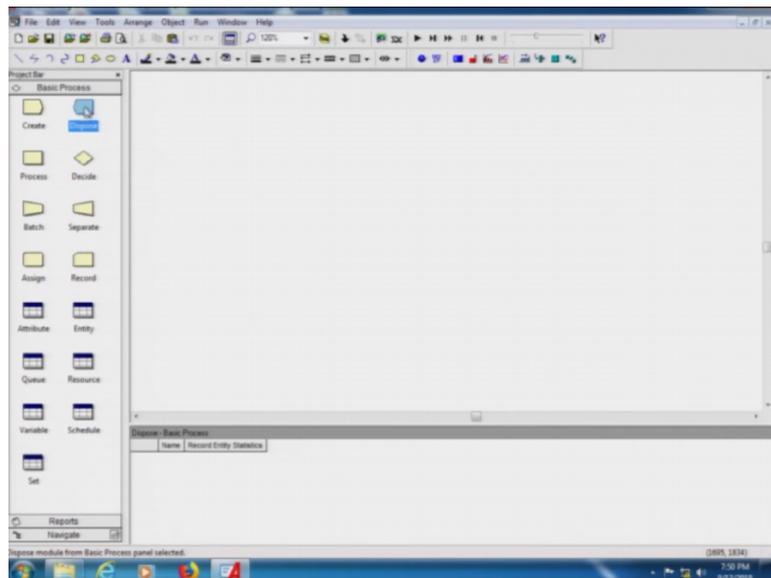
To create allows you to create a arrival of an entity, dispose is like the removal of an entity.

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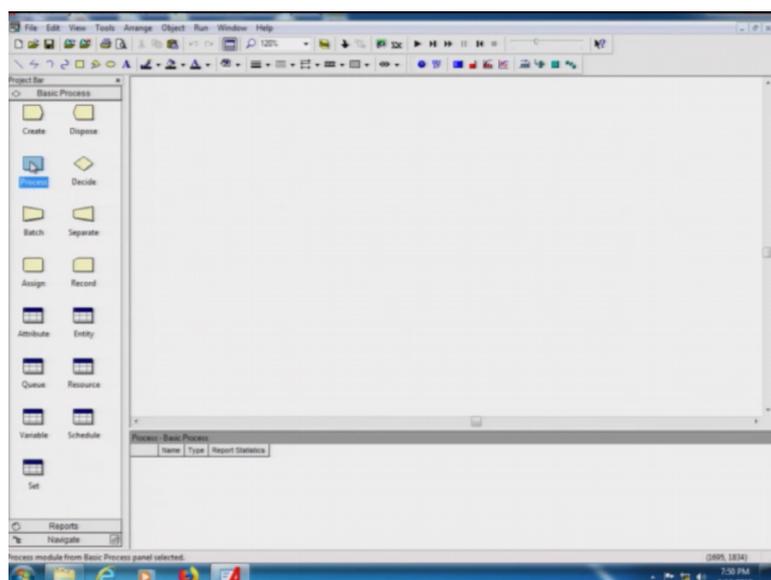
Process is any type of a process milling, drilling, cleaning, service process cleaning inspection they all come under the process. Process is typically a transformation process.

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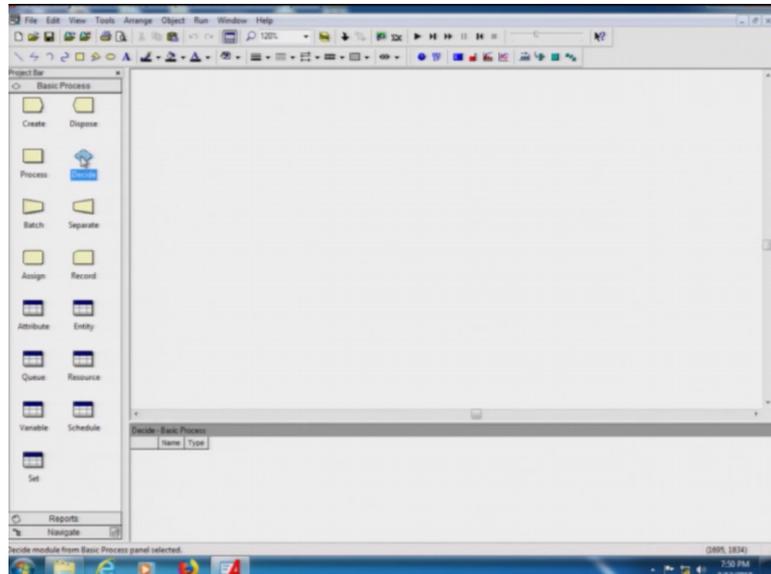
Then there is a decision module available to you.

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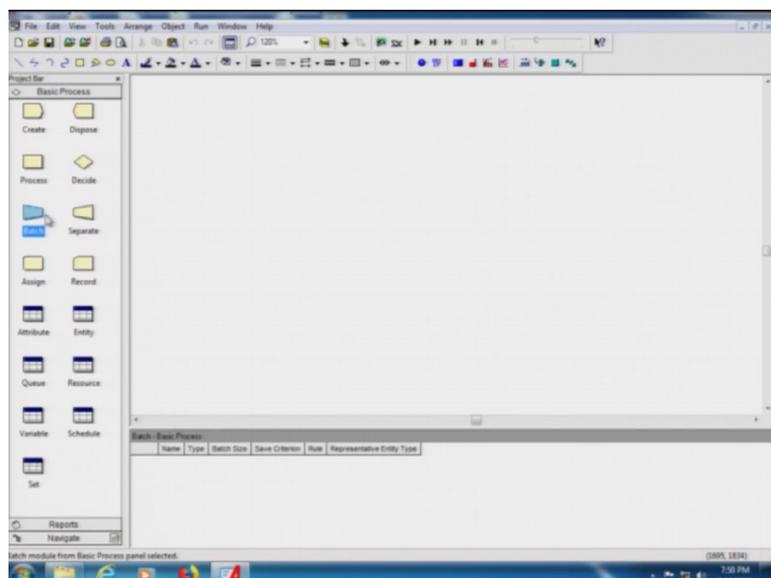
Then there is a batching option, batch means you group things and so, that they all follow a same pattern.

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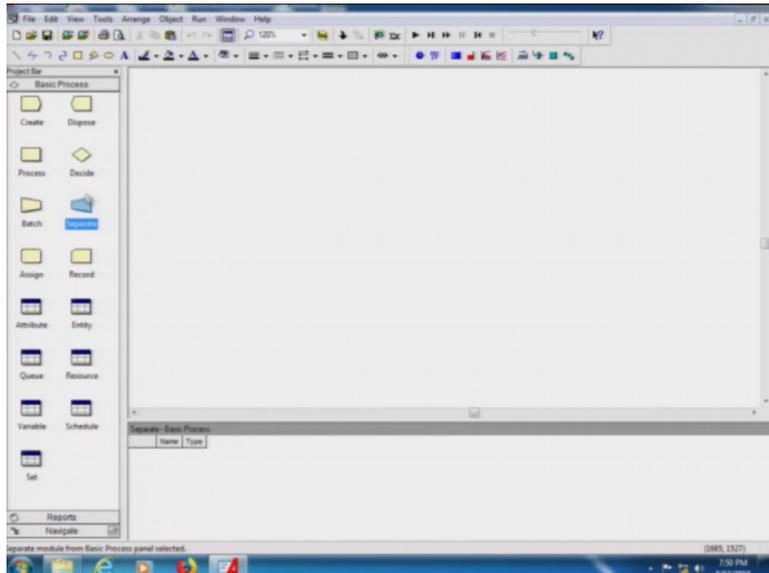
Then there is a separate option available, assign a record all this kind of things and similarly we have what we called as attribute.

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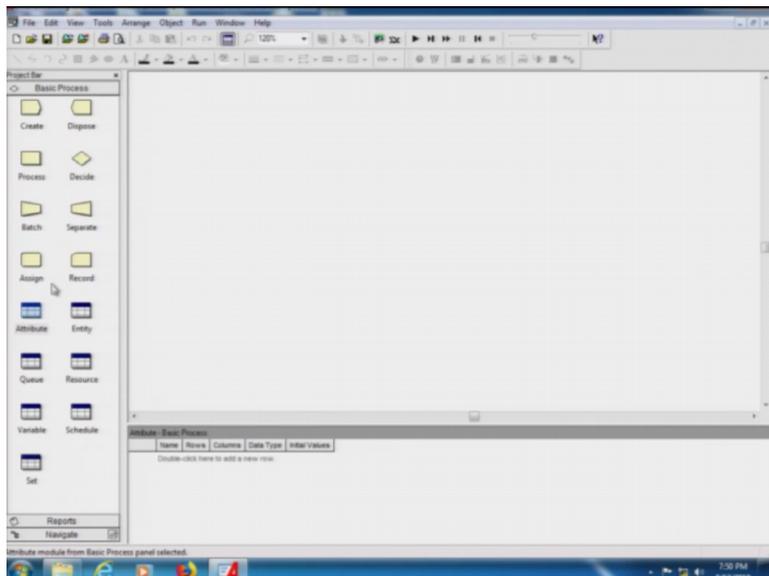
We are seen attributes are associated with entities these are specific aspects of an entity.

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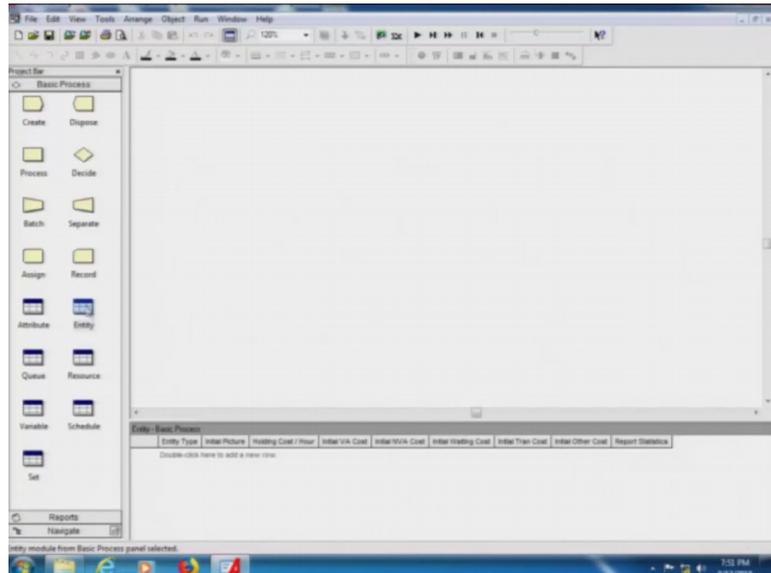
Then you have entity. Entity is think that both within the simulation software or the simulation model. So, this is a way to you can create an entity.

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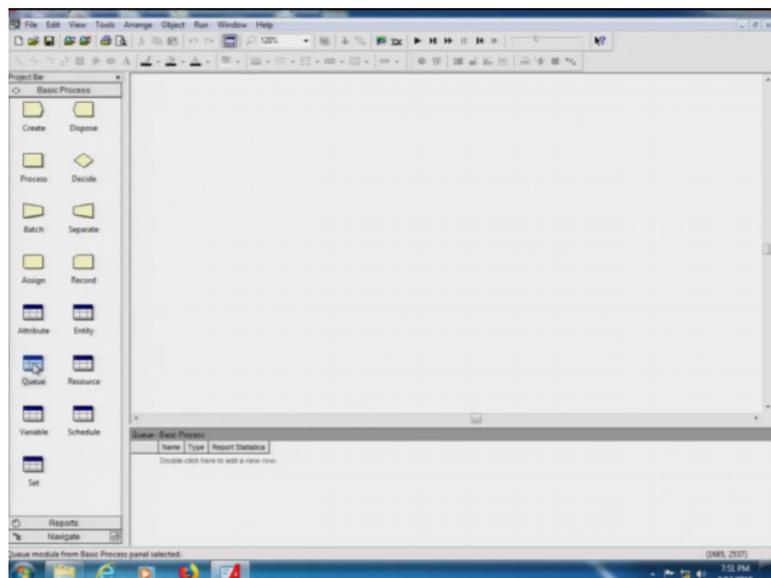
Then you have queue; queue is the place where the entities way to get serviced.

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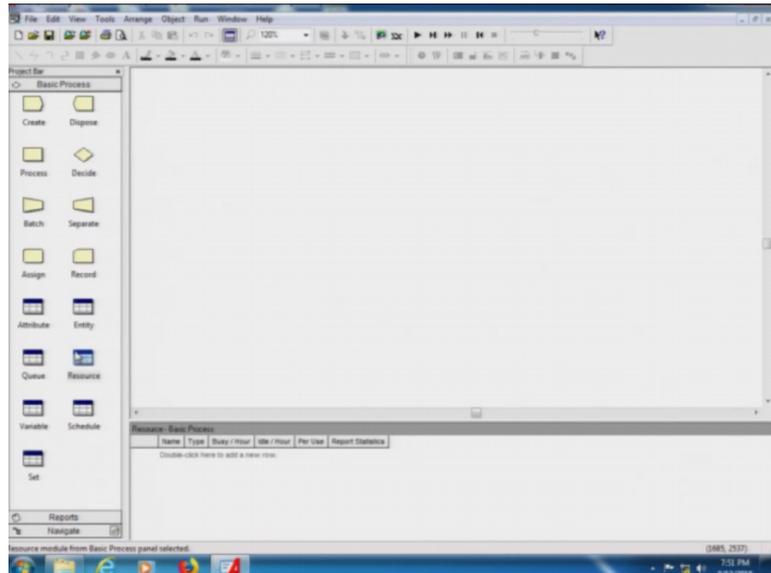
Then you have resource. Resource is where the entity goes there to get it service done or a value addition happens at a resource.

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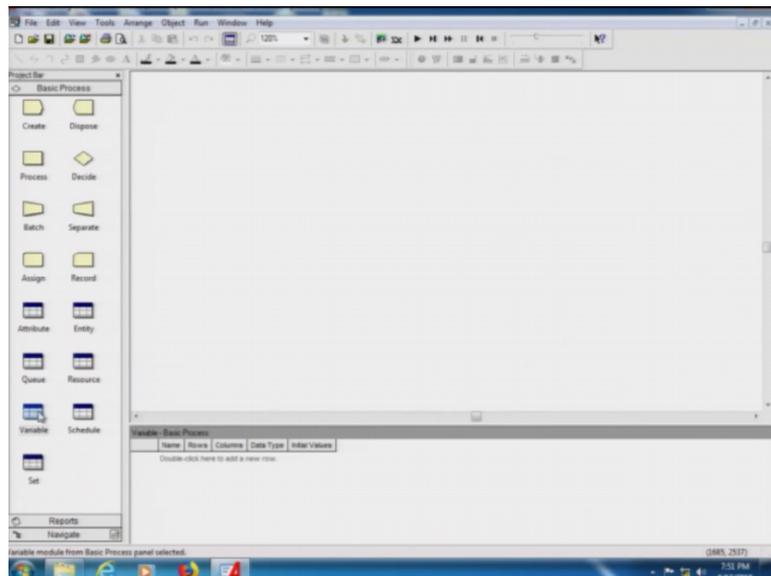
Then there are variables whose value varies.

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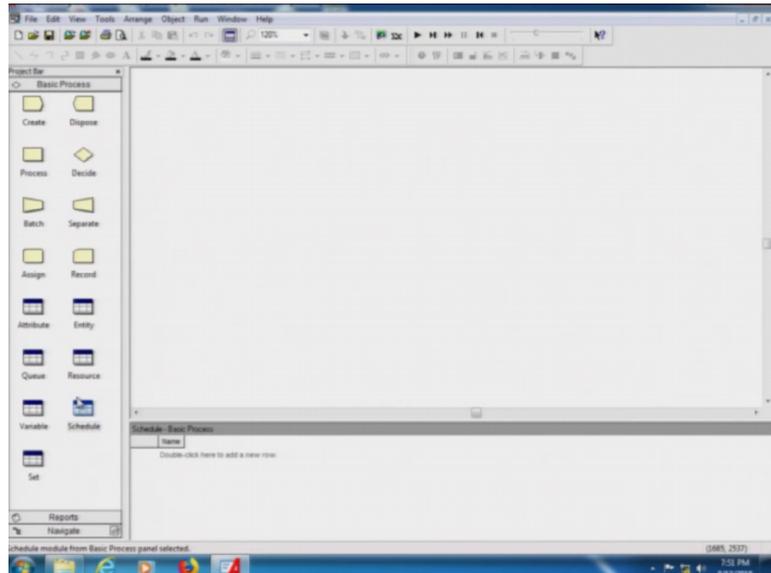
Schedule is a condition or a specific set of time resource pair assigned. So, that we know where the activity to do.

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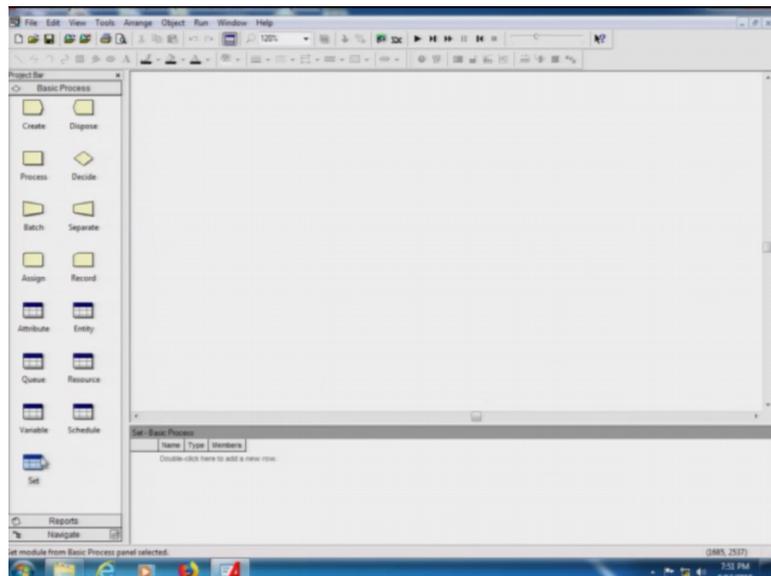
And then there is a set of activities which is like a different with than style is different than a batching process.

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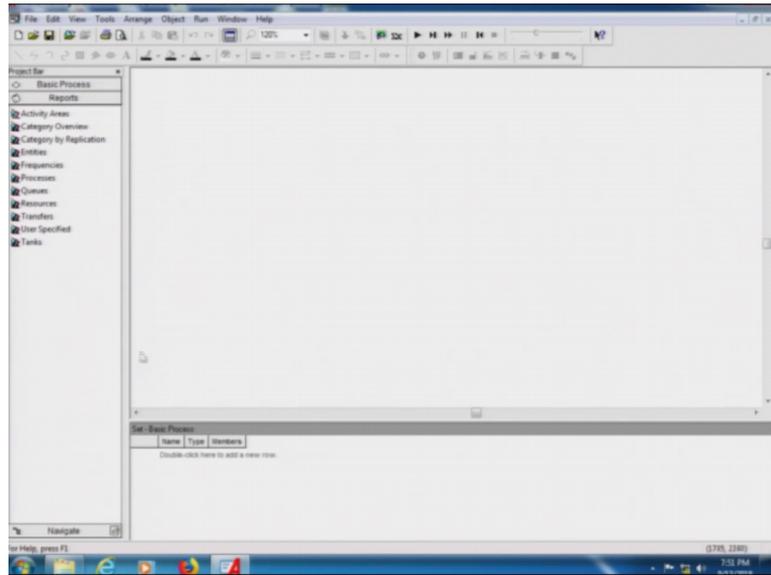
So, these are the basic process is of it, then you have the report modules which shows you the reports that are associated with it and it also shows an option of how to navigate with the simulation model ok.

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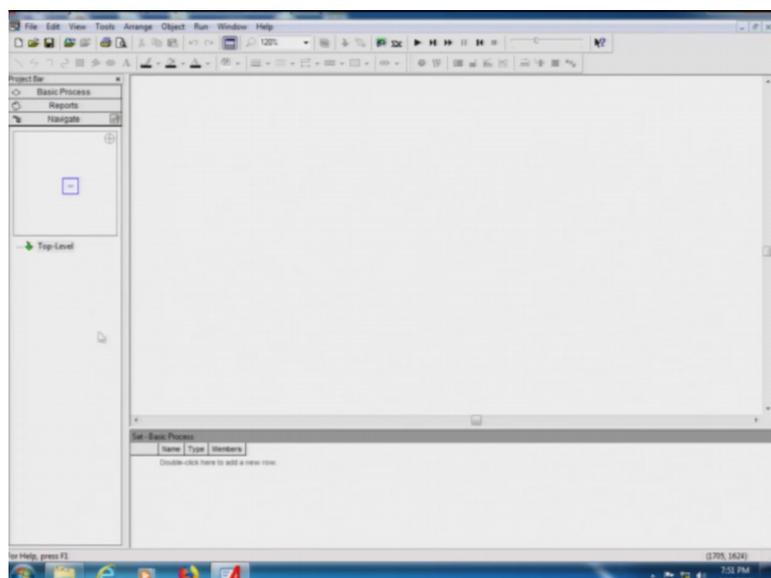
So, today given that I am given that we just talked about the simulation and the different aspect of ARENA, and then you have the icons of various aspects of ARENA shown right here. New file, opened file save then attach certain values print zoom print preview then this is like same like a tape recorder play buttons now play a stop rewind all those kind of things, when you are doing when you are trying to do the simulation model when you are trying to do the experiments with the simulation model.

So, I hope you guys are understood what a ARENA basic aspects of it. And whenever you open an ARENA, you can actually see that it is a student version its a training and devaluation mode it is cannot be used for commercial purposes, you can see it on the top of the status bar. And you are by default you open a model, which is called as the which is shown here as the model one shown right here this is model one. So, whenever ARENA comes in you are allowed to do all this kind of things.

There are couple of options the first thing is I want to show you is the grid aspects ok.

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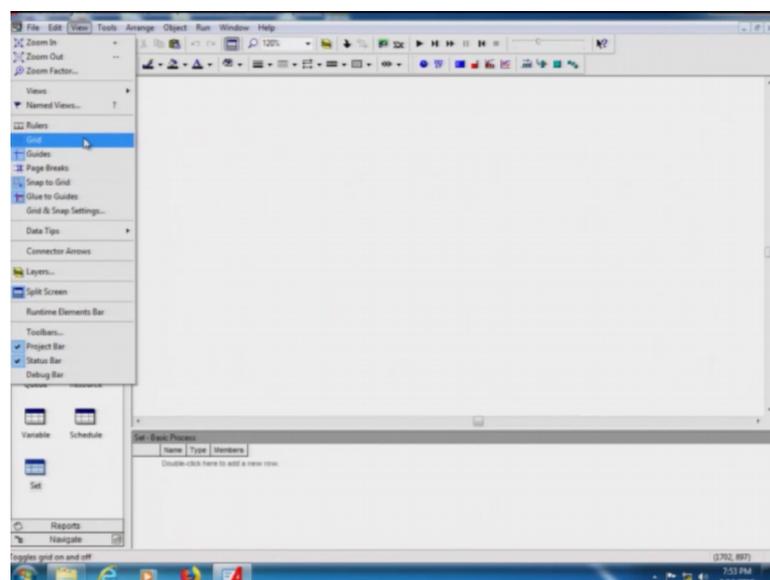
So, if you click this grid ok.

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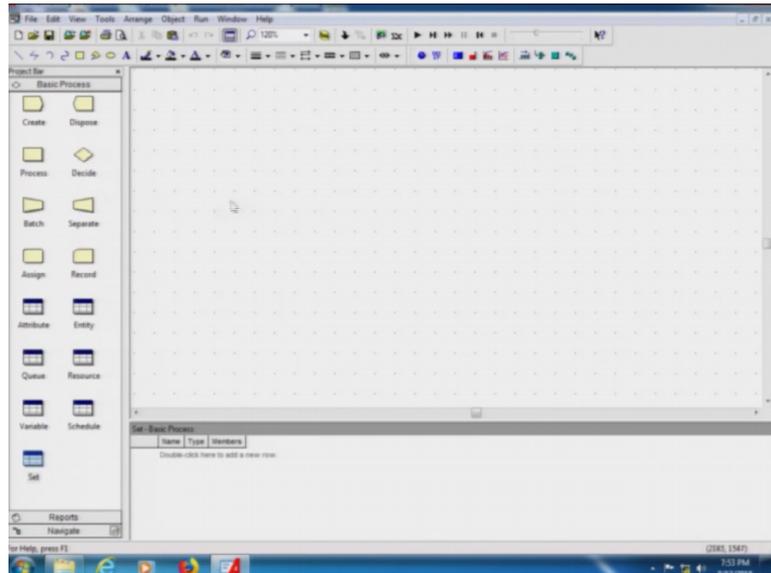
Then you can see that this portion where you are building the model, you will get these dot dot dot which is like a graph paper like a larger graph paper but so, that you can arrange things nicely. If you do not want it, if you do not like it you take this away and it will go away from there.

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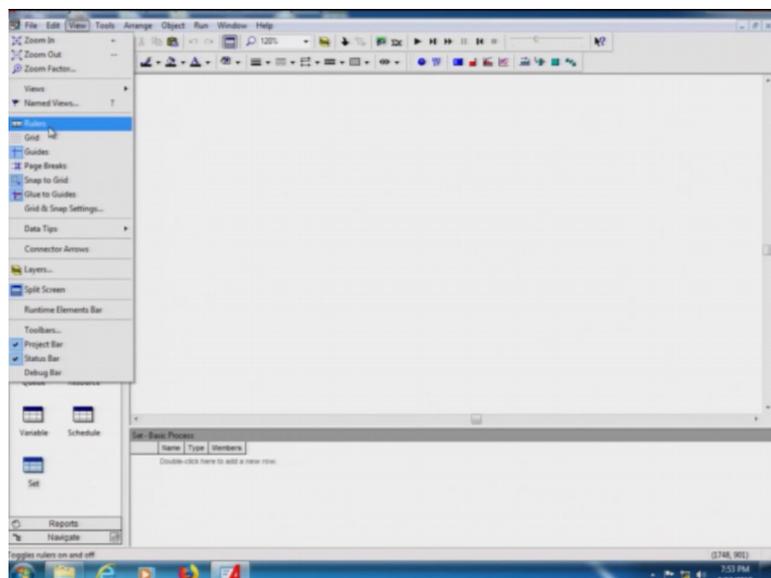
Same way you can put rulers.

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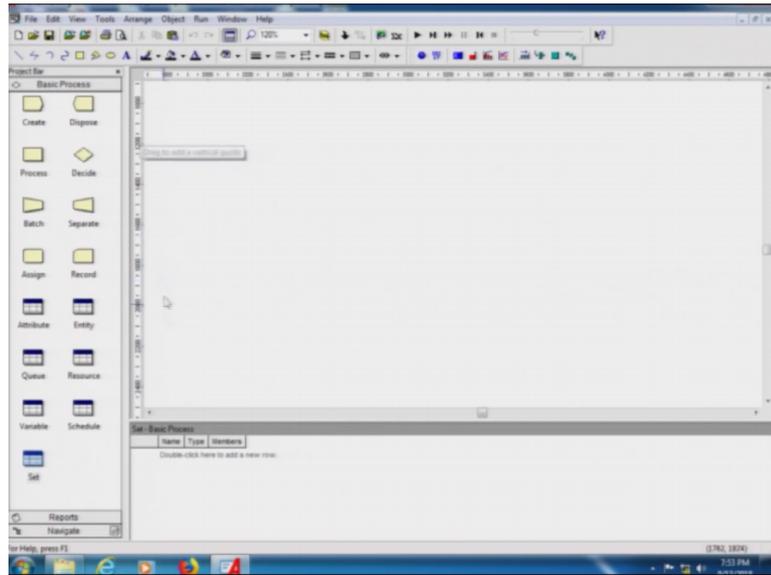
The minute you put rulers you will actually get to see rulers on both sides; here is a vertical ruler and here is a horizontal ruler. So, a building a model which is more like the layout of a factory, then the ruler is a good thing for you to have. And if you do not want the ruler you can click the ruler again and the ruler goes away.

Same way you can also ask for guides. So, the guide means whenever you are going and clicking at any point of time, you will actually show you what the specific aspect of it is and if you see a grid also you can click the grid. After period once again if you want to see the grid, then you go to the view and click the grid and the graph paper like arrangement comes in so, that you can arrange things all in the same order, same level and other things.

If you do not like it, then you can click it off I normally do not use the grid, but some people do it. You can also use ruler and this is specifically available we can see that will you move this these two blue lines can see a blue line here under see a blue line here these blue lines can be used to exactly position where it is. This is typically helpful in when you are trying to simulate the area inside a factory for movement of those kind of things. So, this kind of a scenario is pretty good in a system like that ok, but if you do not like it go click the rulers and the ruler will go away.

So, initially when we make this model, we are just going to we are just going to see how to just make a model we will not worry about grids snapping to grids and those kind of things. So, as I said earlier any ARENA model, what we have to do it is we are trying to

how to use these basic processes of ARENA to build this. If we want the advanced processes then you can go here and ask it to show the advanced processes, but I will show that slightly later not now because I do not want to confuse you guys ok.

And other part of it is, we are going to build a very simple model. Very simple model means we are only going to use one machine single machine problem. So, the first thing that you need to do is, you need to create the entities that are going to come into the system. Entities means, the things that are going in a factory. So, the first thing that we are going to do here is we click the create one then click it.

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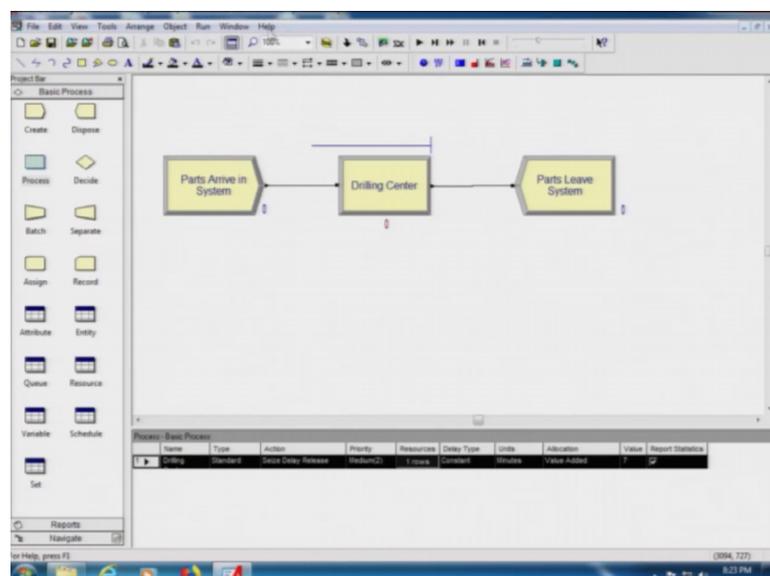
Keep clicking the mouse drag it and leave it at this whitespace you can move it anywhere around in the white space. So, this is the first module that we use; first basic processes of ARENA that we use which is called as the create module. So, these basic processes in ARENA is typically called as modules in an ARENA ok.

So, the create modules is typically used for if you look at here, create is a basic process it is written right here and this one means is the first create and the name is create one you can change the name I will show you how to change the name and the entity type is, it can also changes and this basically says random is the type of the create, which means its a exponential distribution the time between arrivals exponential so, that the arrival process is random. Then value is one which means that is one entity that is created the unit is hours. So, if you say the five means. So, now, this means in every one hour on an

average entity is created, and one entity per arrival. So, one hour arrival happen there is only one entity and it can it can create up to infinite entities.

So, these are the details of the entity, and you can see that I am going to show you how to actually use this create to create an entity arrival. So, in this case the first thing I am going to do is, I am going to double click, this ok.

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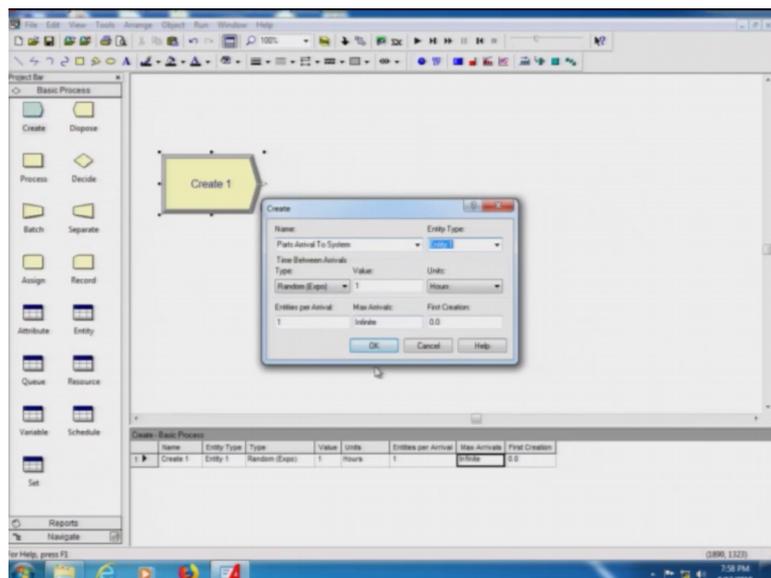
So, if we go to this module and double click, a new window opens up right here ok. This window allows this is the same thing as the basic process here, but it is a little bit more of a better user interface ok. So, I am going to change the name of the create, I am going to change it into parts arrival to system ok. When I say that its call parts arrival to the system and I click any other place. So, it will change the name of this one once I finish with that you will see out is being done I will just show you ok.

The minute I click the name of it is create one is now change to parts arrival to the system and you can see that the name also has changed right here ok. So, if you double click this, you will see that the parts arrival to system or parts arrive in system changing the name ok. And the entity type is written as entity one I can change this. So, what I do is I click on this the whole thing is highlighted, and I am going to say it as the entity type is part. So, a part is arriving in the system and just naming it as a part; and it says is time between arrivals, it says it as random exponential.
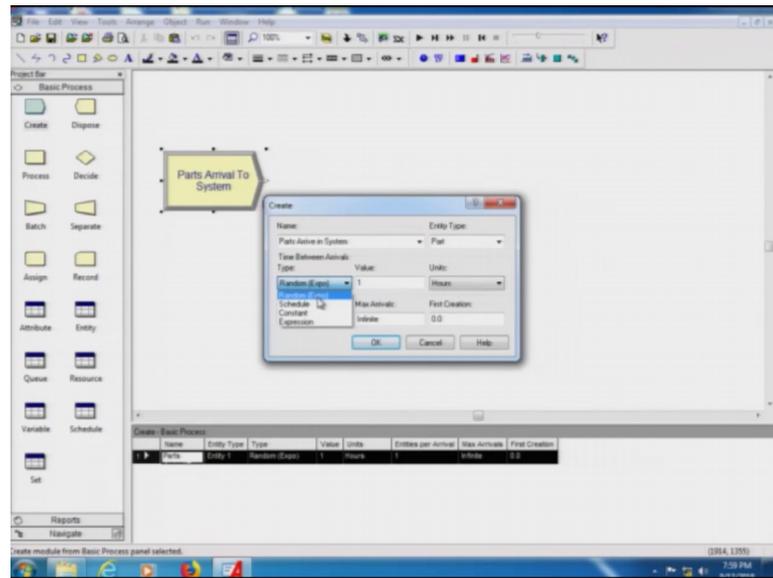
We click this; you will get to see four options coming out of it number one is the exponential then is the schedule. Schedule means it you can make things arrive at a particular schedule then there is constant. Constant means at every specified constant interval and it is will arrive into the system and then there is an expression, you can build custom expressions if you want to simulate any specific scenario.

So, for this purpose we are just going to keep it as random exponential ok. And I am going to change this value from 1 and I am going to say 5 ok. So, what I am trying to say is that, the time between arrivals. The time between two entities that are arriving into the system follows a random process. Random process means the time between arrivals are exponential; in the probability lecture that we are going to see in the class soon I will talk to you about the random the exponential distribution and why it with the significance of the same.
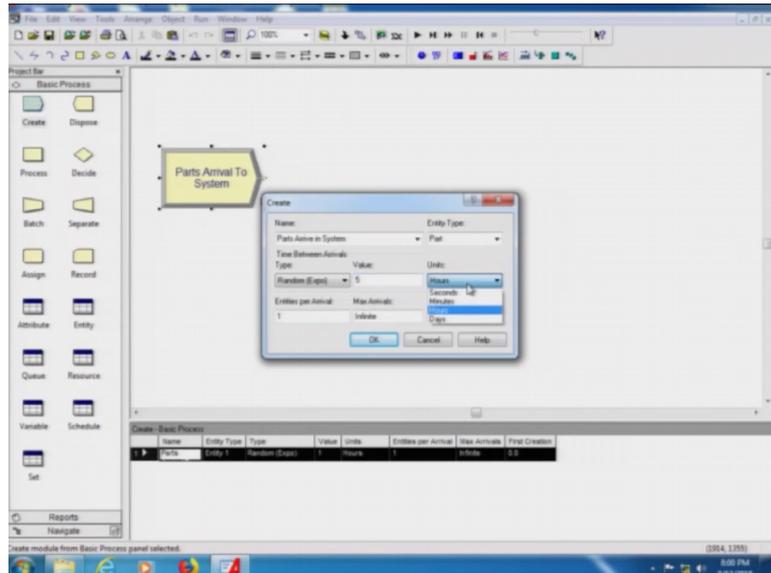
And then I am going to change this units of hours into minutes. So, what I am saying is that, the time between arrivals of into the system is a known a follows and random process, which means the time between arrivals are exponential and the time between arrivals of a mean value of 5 and the time units are in minutes. So, it is an exponential distribution with the mean of 5 minutes ok. And I say that the entities for arrival, I leave it as one maximum arrival is that infinity and the first creation I leave it at 0. So, the first entity gets created at 0. So, once I click this an then you can see that the bottom portion also gets updated ok. The same exact things gets actually updated whatever I click the here gets updated in the portion below ok. So, this is a this dialogue box is a good way of typing things that are necessary for you to add into the system ok.

So, just to make you guys understand this once again, this is a create process that is created and drag and dropped here and then double clicked on it, dialogue box was opened in which you change the name of the system, change the entity type of the system to a part, then the time between arrivals was changed to the distribution was maintained the or the time between arrival process is maintained as a random process, which means a time between arrivals are exponential the value is 5 and the time going to this minutes. And entities per arrival is one max arrival is at infinite and first creations of the main the first entity arrives at 0 time 0.0. So, when the simulation begins it begins by the arrival of the first entity of this much is clear to all or few case.

Once this is done, then the next thing that we do is entities arrive their next job is to actually get processed. So, you require a process box. So, you come to the basic

processes and you click this box that he said as the process and in the process what we typically do is, we click this keep the mouse clicked and drag and drop it here ok. So, we can see that it is shows as process 1 ok. I can see I can move it here I move it here I can move it anywhere. Typically the parts arrive then they moved to the process and then they get out of system. So, you try to create the same flow in a graphical format in the system that is what you trying to do. So, the process follows the part arrival in this system ok.

So, then what I can do this I am assuming that this process is a drilling process let us assume that is a drilling machine ok. So, what I can do is, as I said did I earlier with the create process I double click this.

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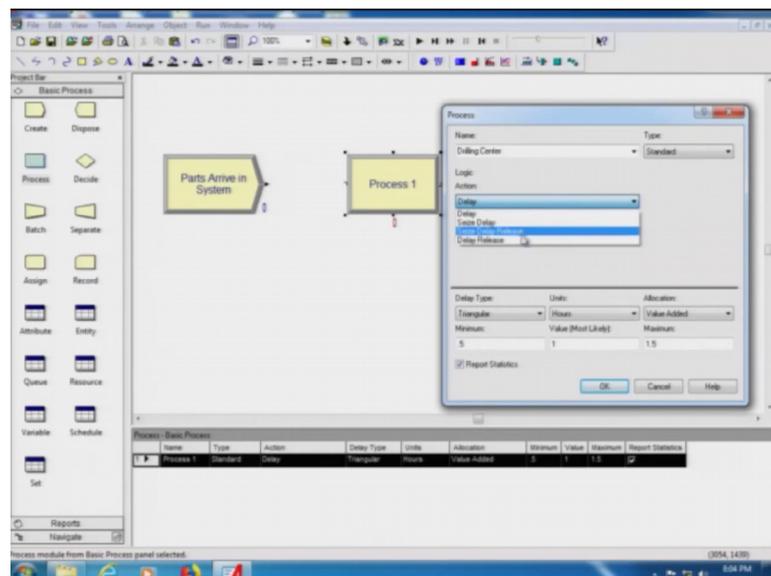
And a new process gets opened; and the first thing is the process one is the name I can double click the name; you can also see that is right here. So, I double click the name and I am going to change it as the drilling centre ok. So, my process name is its a drilling centre ok. So, instead of process one now it will be named as a drilling center ok.

Then there is different type of processes the. So, it can be a standard process which means, a standalone process like this or it can be as sub model which is the second option that is given here. We will study what is a sub model in the latter classes ok. Then there is a logic portion of it where we basically how to decide what is the is the logic

with this. So, that the most simplest logic in the case of a process is a delay process; delay process means it comes in and it just waits ok.

So, for the delay there is no logic, but you look like this you can actually see there is a seize delay seize delay release and delay release ok. So, I am going to select the seize delay release process, which means an entity comes into the system and then it waits to see whether the resource is free. And if the resource is free it actually seizes the resource and it stays on the resource until at the delay time period where it is gets value gets added to it. So, in this case is a drilling center. So, I hole gets drilled on the system and once it is done the hole is drilled properly then it is released ok.

So, this seize delay release is a value addition system, where what we are trying to do is be the entity that is coming into the drilling centre, seize tries to see whether the drilling centre is free and if it is free it seizes the drilling centre. And once it seizes the drilling centre, it gets delayed on drilling centre until the hole gets drilled and once the delay is over, it actually gets released from the system and then it goes and does what is supposed to do and it the process the next entity tries to seizes the drilling center ok.

The minute you use the seize delay release, this new form comes up which is the resources ok. Before the resources I want to bring your attention, to something called as its priority; and for the time being we just leave the priority, at medium we can have a high priority which means any entity with the higher priority will go first then there is a medium and then there is a low. For the practical purposes we are going to use the medium as a priority at this point.

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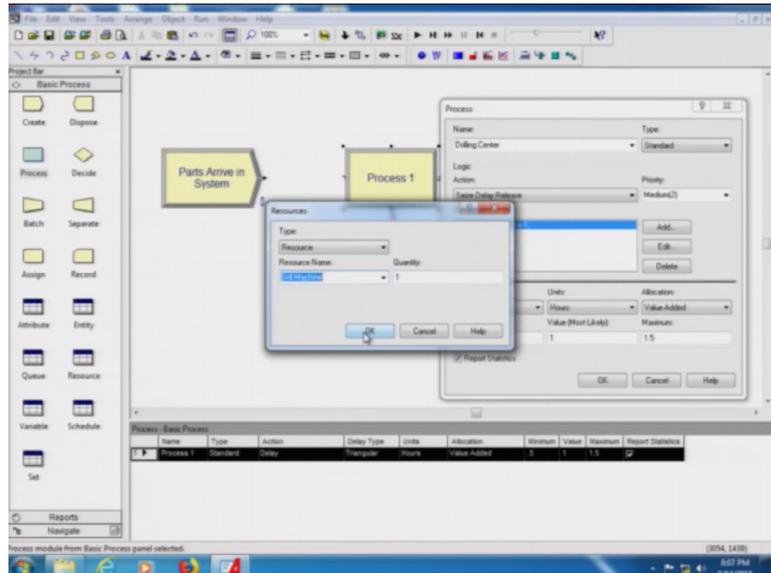
Now as a resources what we are going to do is we are going to click the add resource at this time period. So, when you click the add resource you get this new screen new pull out. You are going to add a new resource this resource is a resource that will be try to seized by the entity; and the resource name by default name is as a resource one and I am going to change this two new one it is called as a drill drilled machine ok.

So, the drilling centre has a drill machine.

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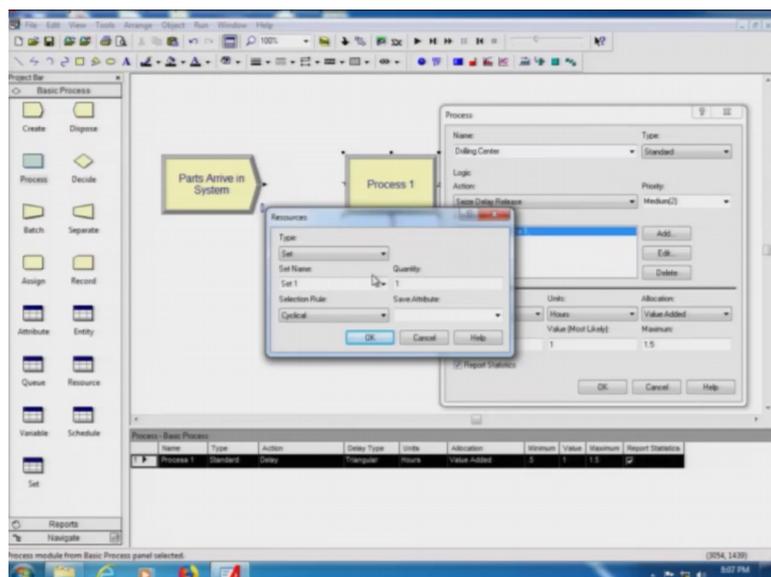
You can make it as a resource or you can make it as a set. If you make it as a set then its a set of it resources. If you make it is just a resource then the name comes back it says

the drilling machine and I have only one drilling machine for the time being. I can make two drilling machines which becomes parallel resources we will study all of this later. So, as of now we are not doing set, we are only doing the resource in which the resource name is now changed to drill machine and I hit ok. The minute I do that, you can see in the resource tab the resource drill machine number 1 or numeral 1 comes up. Which means this is drill a release process this is a process. Seize delay release process uses a resource. The name of the resources is drill machine and there is only one unit of that that is what it actually says and this also tells ARENA or the simulation software package that there is a machine. So, you have to keep track of the utilization. So, this is where you see this reports statistics is written right here which actually allows you to collect the statistics of what is going on in the machine ok.

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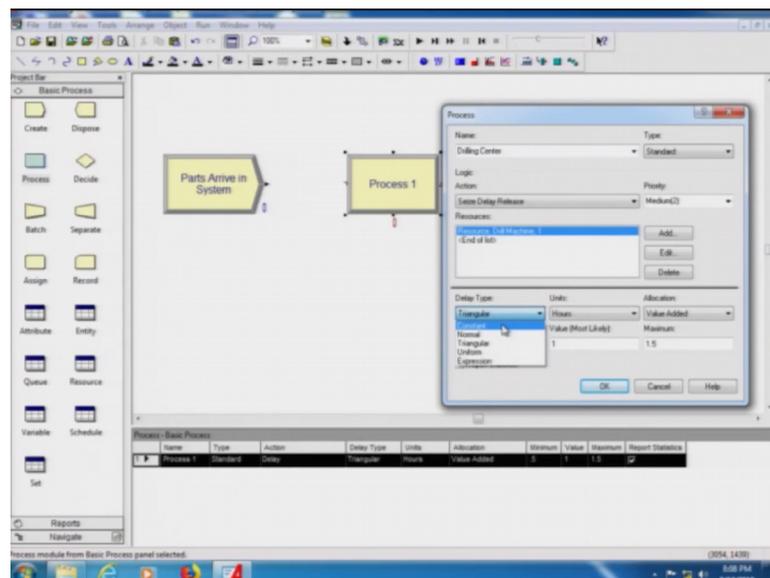
Then in this case there are also you can do multiple delay types for the simplest option now in going to make it as a constant process. The constant means there is no variation in the system. Other option is normal the minute you hit normal then you have to provide the mean and the standard deviation you put a triangular then you have to give the minimum most likely and maximum value. We put uniform it will give you the minimum and the maximum, then you can use the expression also where you can put the exponential there are multiple probability distributions are available right here you can see triangular, Erlang beta gamma all those kind of things available here.

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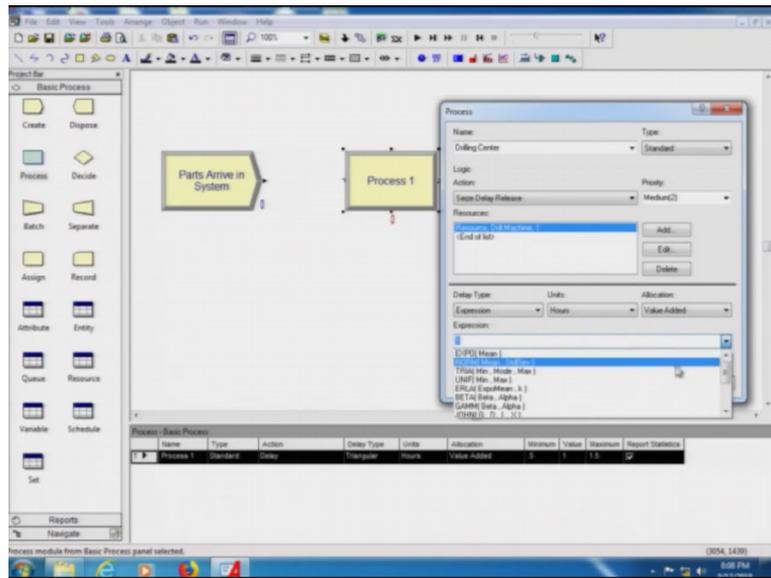
But we will see all of these things later, for the time being I am going to take the simplest one which is called as a constant ok.

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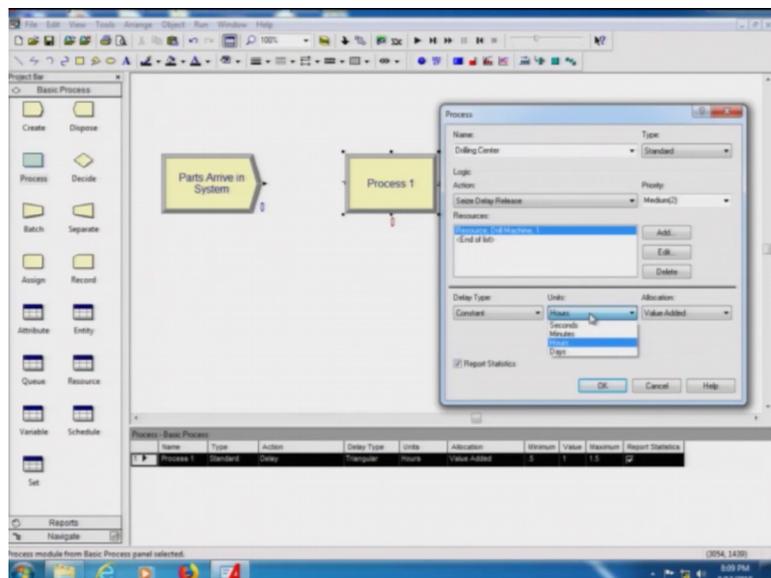
And I am going to change the hours to minutes because arrival is in minutes. So, I should probably how the service also in the time the a process time also should be in minutes and let us say the time going to give it as a 7 minute process.

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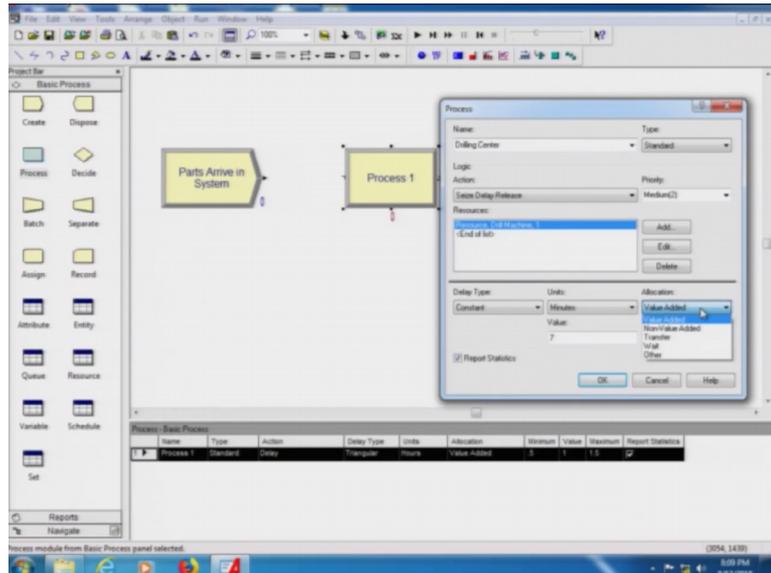
And you can do multiple thing, its a value added non value added those kind of things I am just going to use it as a value added. Non value added you are just waiting there delay no value gets added to the system transfer means you are moving it from one thing to another typically it transfer from one pallet to another stuff like that.

And then there is what we call of as a wait where is we are waiting in which you are utilizing space and resources stuff like this.

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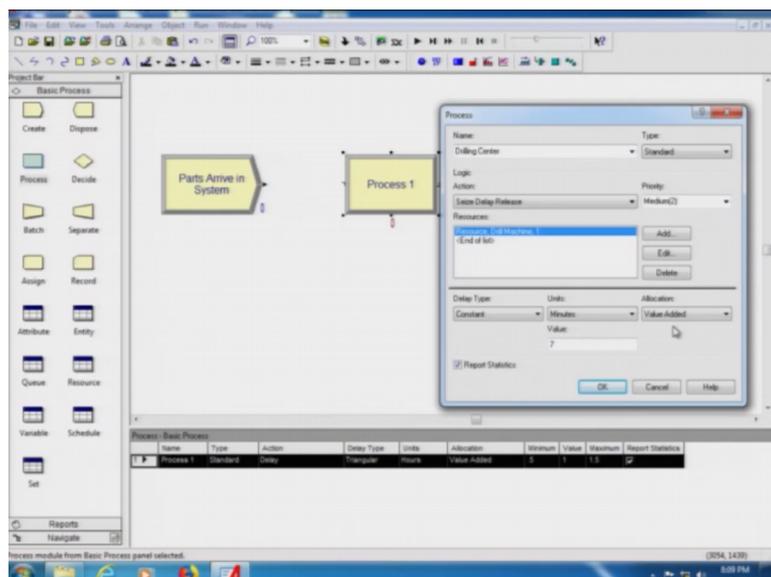
So, for that as of now we are just adding the value added part of the stuff ok. So, once you have made the value added part, then you hit ok and you can immediately see that

the drilling center comes under picture and you see this blue line we are looking blue line which is a queue ok. So, we can see that, the drilling centre is a standard resource type is seize delay released the priority is medium this one resource delay type is constant in minutes and it takes 7 minutes to get the hole drilled ok. So, if you double click this again this dialogue box comes up where we can keep on changing the things all right.

And you can also see that there is a drilling machine queue ok.

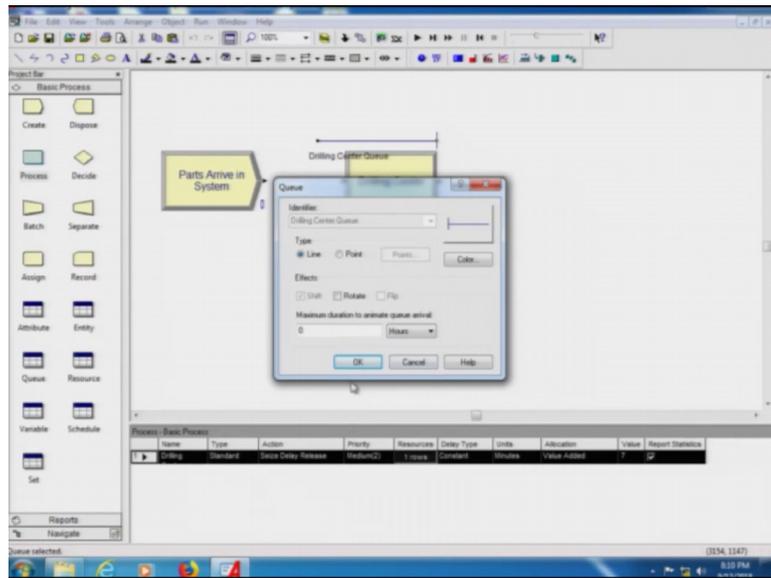(Refer Slide Time: 24:43).

So, if we double click on this, it actually shows the details of the queue. For the time being we will not do anything with it we will just leave it here and we will come back to this later down the road ok. We will see how the queue aspects and other things are see but you can also see that if I click this queue and click this here I can see that details of the queue right here. So, the way to do it is, typically first go typically you will be in the process you will see the details of the process what you do is you click on this queue it says drilling center dot queue, which means this w is associated with the drilling centre this queue is associated with the drilling center the name of the process is drilling centre.

 Now if you want to find the details of the queue, what is the discipline of the queue? The queue is the place, where the entities will come and wait then I click on the queue, it says the drilling center dot queue then I come to the basic process and I click this spreadsheet like thing called queue. Minute I click it the details of the queue gets shown here ok. The first one is says us the name of the queue which is drill center dot queue that is the name

of the queue then the type it says first in first out which means FIFO which means whichever entity comes in the first it will actually leave the first also ok.

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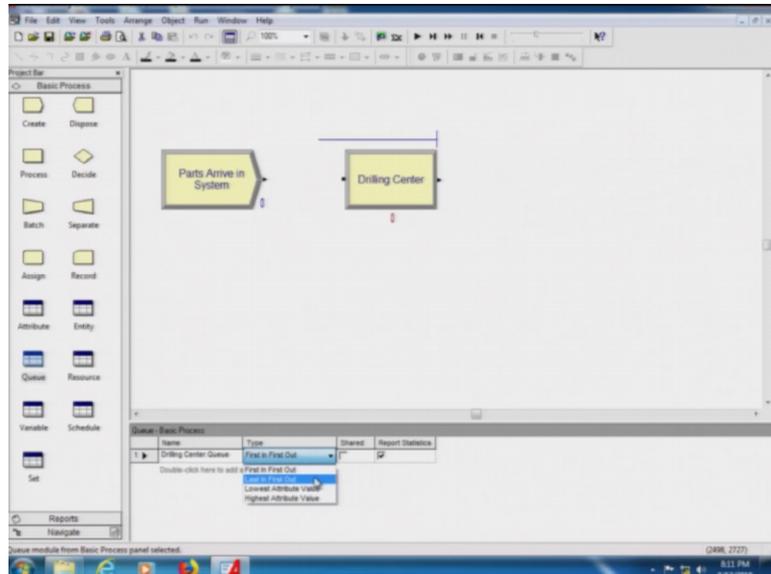
The next one that we are going to see is that there is a LIFO; Last In First Out which is typically like a stack we are not going to deal with the other things. The lowest attributed and highest attribute values this are used if you provide the priority. So, the high low values are used, if you are providing the priority in the queuing system ok.

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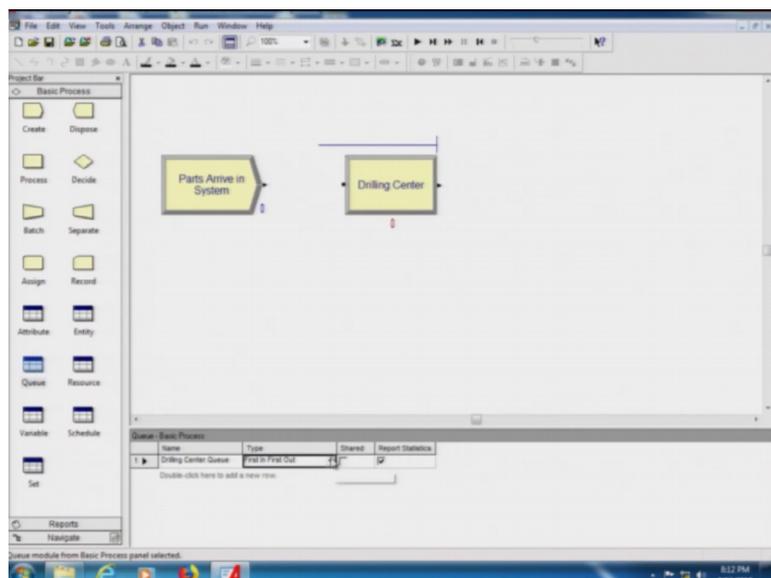
And this is not a shared q it is only associated with this drilling centre. There are multiple drilling machines here because there is only one drilling machine as you remember. So, you do not need to share the q since there is only one drilling machine. So, its not shared and you have to reports that is 6 on the queue; that means, when the simulation is done ARENA will report the statistics of how the system is performing with the in this case ok.

So, you have seen how the create a process and see the queue aspect of it.

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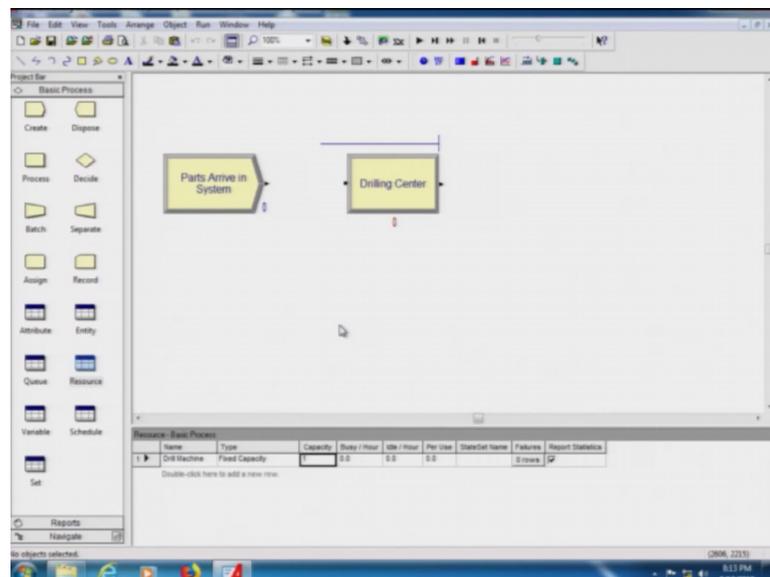And if you click the resource here it actually shows you what is resource that you have created it shows a drilling machine as the resource that was created there is one resource that was created drilling machine. So, if you click this and there is a fixed capacities; that means, capacity of the drilling machine is fixed one; which means it there is only one drilling machine how many how many times it is busy, how many times it is ideal all this things values will be populated after the simulation is done or you can provide these kind of data here if you say ideal per hour means if you say 0.2 per hour, which means 20 percent of the time in an hour the machine should be ideal. So, it would enforce those kind things. We will talk about all those details later down, the road and you also have to report statistics in this point ok. So, there is also written like here.

So, you have probably seen the basic aspects of how to create a model in ARENA; then the last thing you need to do is once the parts arrive into the system. The entity arrives

into the system in most of the drilling center the machine is free, it seizes the machine its gets a whole drilled and then it is released from the machine. Then once it is released its job is done then it has to go ahead and leave the system, that is created by using this thing called dispose ok. You click this one and drag it right here which basically says it is used to simulate the scenario, where the entity leaves the system.

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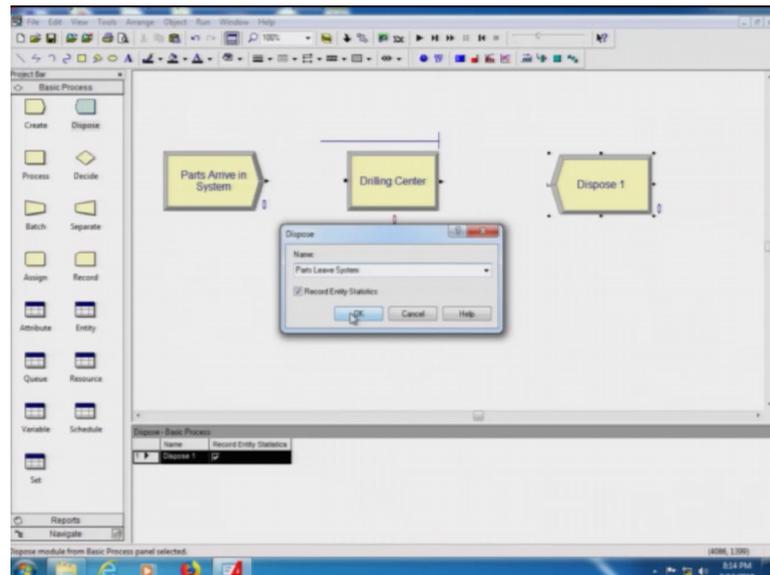
So, if you double click this it actually shows the name of this one and you can say that parts leave system ok. Look like that and it also there is a box called record entities statistics; please remember to click this so, that you do not have any problem in this regard ok. So, that all the entity statistics at stored. You click and then what happens is the new name gets changed here it says parts leave the system ok.

So, once it is done, you have the basic building blocks the arrival of the entity into the system, the process the value addition process and the point where the parts leave the system all these three are created. Now you have to somehow tell ARENA of simulation package, how the entities will flow from one place to another for that you have to connect this modules or you have to tell the simulation package, which module is connected to whom. So, in our case the flow of logic is from parts arrive into the system to the drilling center; and from the drilling centre the parts leaving the system. So, for that we used this tool which is called as the connect tool ok. So, we click the connect tool and you go to the place where the connection should begin, where the entity should come

from. So, the from is always shown in the green color ok. So, you click here and then you take it and move it to the red color red color is the 2.

So, the minute you click here, we can see that it is connected so; that means, parts arrive into the system and from there it will go to the drilling centre and when it reaches the drilling centre it will see whether the drilling machine is free. If it is free it immediately gets to the onto the drilling machine and hole is drilled if it is not free then it goes and waits in this queue for the machine to be free. And once the machine is free and it turned comes from the queue it will actually move into the drilling machine and it will get its hole drilled.

Similarly, once the hole drilling is happened, it has to now move from the drilling machine and that is will leave system. That logic is created by again clicking the connector and bringing it to the drilling centre which means this is the from. Now the parts which are finished the drilling of the hole, will move from the drilling center to the parts leave system which is the dispose portion of the entity like that it is connected. So, it does not have to be in a straight line, you can actually put it right here or you can put it right here things will adjust accordingly you do not have to worry about any of those things I usually like to put things in a straight line. So, I can keep move the things like this or that you know you do not have any problem doing this ok.

Now if you think about this, what we have just created is a graphical representation of a single server queuing system. Single server queuing system is the present by the drilling machine, where parts arrive into the system goes to the drilling centre gets a hole drilled and then the parts leave the system. And we have a queue which is first in first out details can be seen from here, we have a resource which is a drilling machine is a fixed capacity, and we also have an entity can thing is that is a part and the details of this we will add much later down the road ok.

So, now, once we have finished this then have what we have to also do is, we know how to use this to conduct an experiment. For that the first thing we need to do is, we need to go to the top portion of this one which is the file the concept and then you come here to the run option ok.

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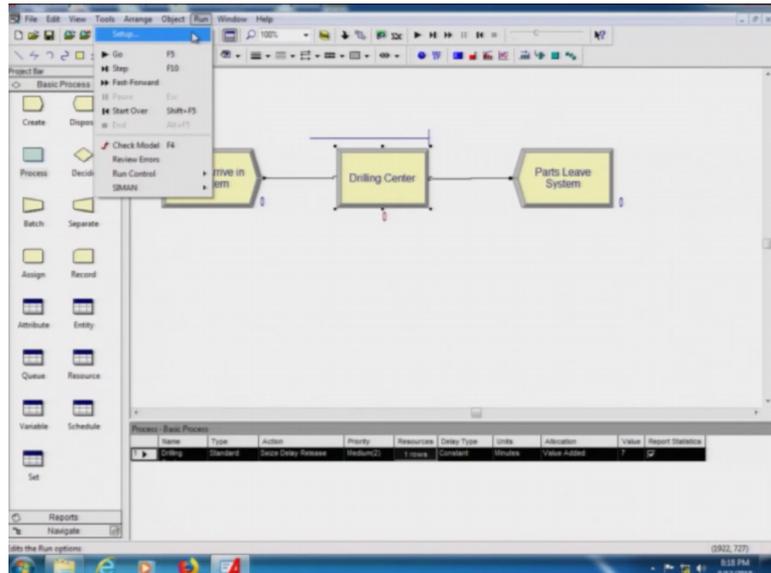
When you click the run option, dropdown menu or drop down like a new window shows up in which the first thing that you need to pick up is the setup. This is the setup that you will use to run the system ok.

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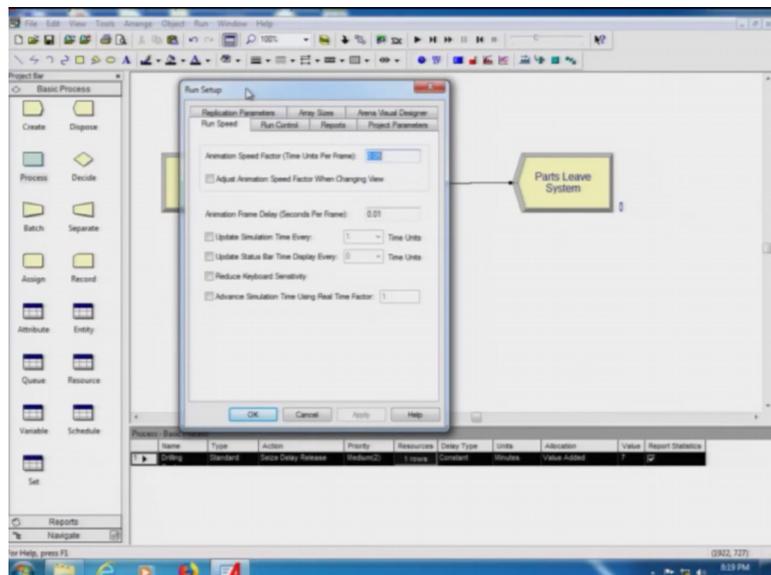
So, click the set up and a new dialogue box appears in front of you ok. This dialogue box is the box by which we do simulation experiments. If you remember simulation experiments is doing numerical evaluation of the system using a simulation mode.

In this particular case the simulation model is built using the graphical user interface of ARENA GUI is a graphical model ok. We are going to use this model and conduct

simulation experiments or what we called as numerical experiments in this system ok. So, what you do is, we go to this run setup and you can see that there are many tabs you go to what you called as the run control part ok.

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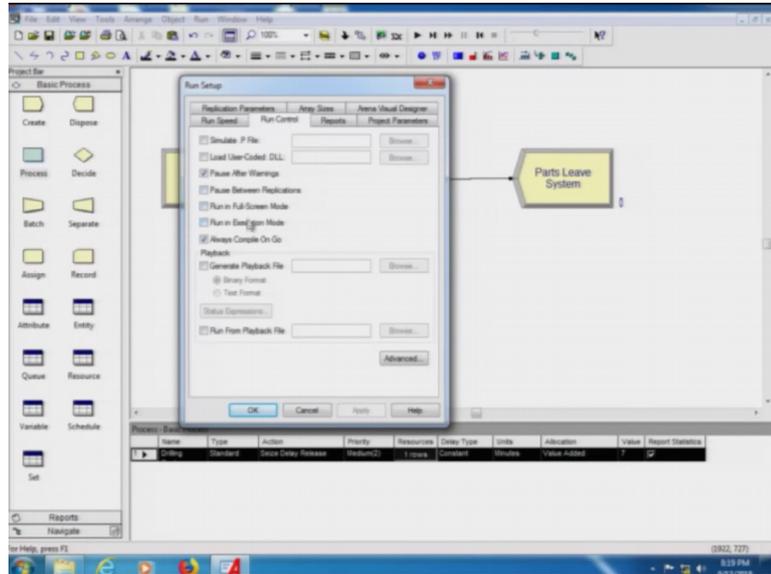
And you ensure that this always compile on the go is clicked and if it is so, then there is pause after warnings also is clicked do not unclick them ensure that you leave them there.
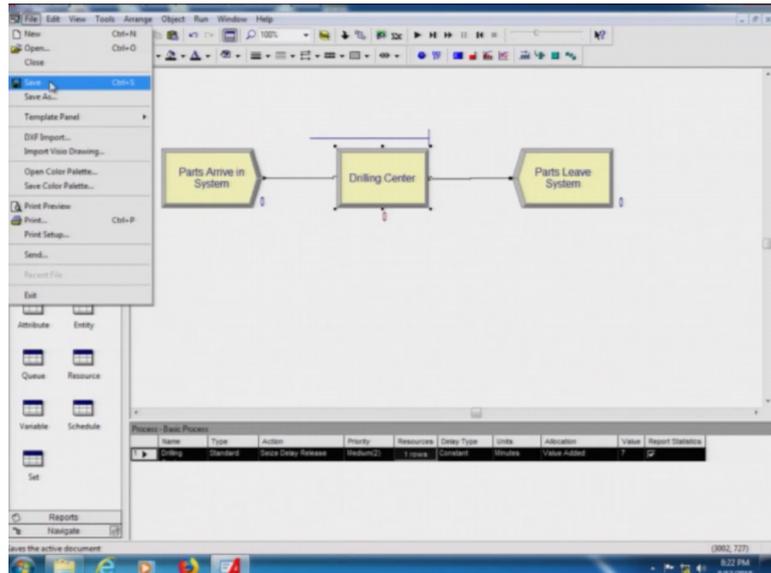
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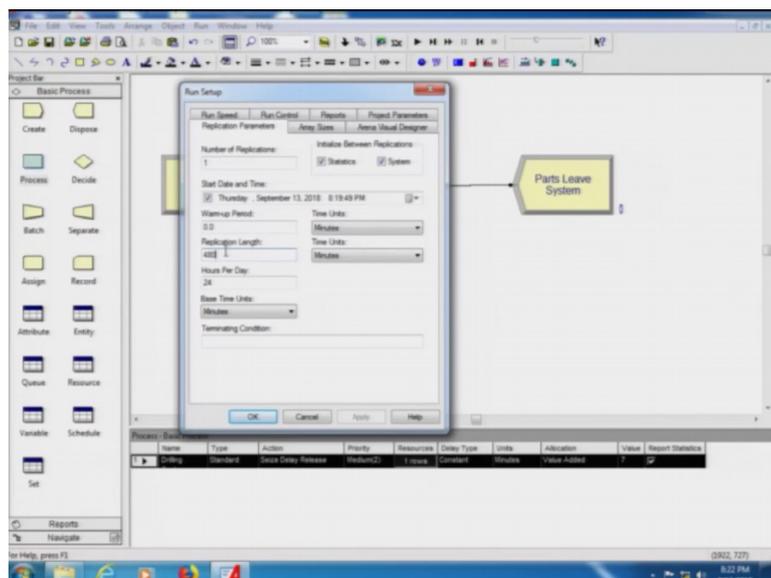
Then you click to the replication parameters ok. So, initially for this model we are going to create a scenario of only one replication single replication and it says the start date and time. So, you can select your date and time, when you click here the date shows up and date and time shows up. So, the this is required for you to keep in records, because simulation reports are used in a chronological fashion. The warm up period we leave at zero for the time being and the replication length is as of now it is infinite that is what people do. Most of the time they are try to run an infinite simulation and then it will it will actually make your life miserable. So, since our case is that, we have been using our time units as minutes I am going to move it into a time units as minutes ok.

The warm up period and the time units for the replication also I am going to make it as minutes and instead of the infinite, I am going to say that I am going to simulate this for let us say 8 hour shift; 8 hour shift is 8 times 6; 48. So, 480 minutes. So, if I say that I simulate this whole system for 480 minutes, that means, I am going to run the model. So, it will start at time z t equal to 0 and it will keep on running until the time clock the simulation clock reaches 480 minutes. Once it reaches 480 minutes the simulation will stop and the base time units I am going to change it into minutes. So, that everybody is of the same criteria and that 24 hours per day we are not going to change that at this point.

So, just to remind you once again, we leave the number of replication at 1 then the warm up period is remains at 0. Before the warm up period they start date and time please ensure that you pick the appropriate date from the date picker that is available and also ensure that the initialize between replications, the statistics and system need to also be saved. Then the warm up period is kept as 0.0 minutes and the replication length is kept as 480 minutes and units and then the base time units is kept as minutes. Again remember that the 480 minutes means I am simulating it, for an 8 hour shift, each shift is 6 each hour is 60 minutes. So, 8 hour shift is 8 times 60 minutes which is 480 minutes. Once I do this and click ok, what happens is that the system the you are ready to run the simulation ok.
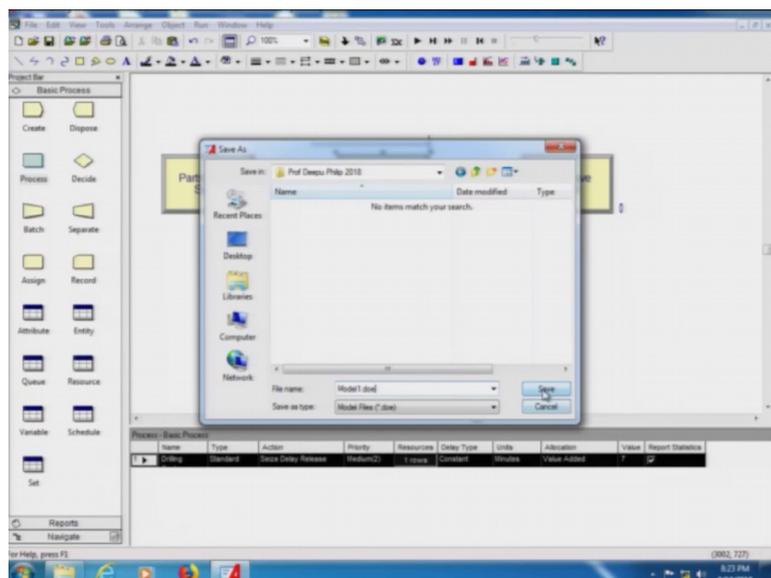
Now what do I need to do is I just need to first save the model.

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So, I say save ok.

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So, it will give me an option. So, I am just going to save it on the desktop for the time now I will actually not save it in the desktop, I will save it in my folder only ok. So, I will save it in the folder where this simulation is there ok. So, I am going to save it as the model 1 and the file is always called as doe. So, I am just going to save it here save ok. The model is saves before running the simulation you have to ensure that you save the model you save it an appropriate folder wherever you want to save it and we can use this model later for analysis ok.

Once it is done, you go to the top and you can see this play buttons the play strep fast forward all those kind of thing ok. So, I am going to click the play button and out of magic let us see, whether we can actually see the simulation software running. So, you click the go button let me do this let me close this sometimes the evaluation versions of it is not ready to save ok.

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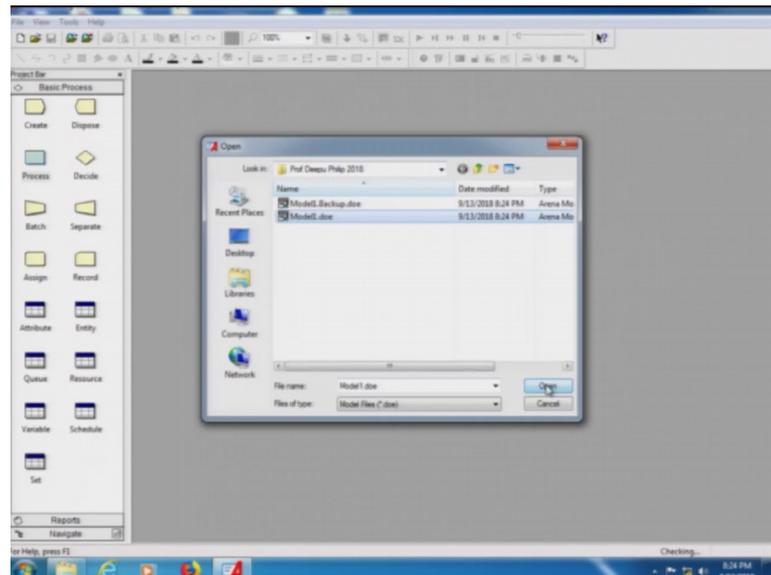
Sometimes ARENA has this issue of creating and plus and experiences. By the way ARENA software when you use, you have to have pretty good memory to run ARENA. In this case you should at least have 8 gigabytes of RAM, if not at least 4 gigabytes of RAM if not 8 gigabytes is a better option ok.

So, but I just did was that I close the ARENA when you have an error like this what you do is you go close the ARENA model. So, everything is closed you got a file and you say open, and you go to where you saved the model and click the model, model dot doe it opens up whatever you are done earlier you saved there, they go to the run and look at the run setup and replication parameters whatever you are done it is all saved right there ok. And what we do this we kind of now going to simulate the model, hold on a second it is doing the checking, it will take a little bit of time period you see this saying checking checking checking we will take a little bit of time period to run this ok.

So, now we had seen the one of the first problems that ARENA software can happen with ARENA software due to the lack of memory. So, we have fixed that problem. So, what

we do is, now again we go back to ARENA, restart ARENA and the click and you are saved the model. So, I am going to do is I am going to open the model and anyway this time I saved it to the desktop. So, life is easy ok. So, opened this and the same thing whatever we show, the same model is available. So, this is one of the advantage of saving the model, you can see the queues resources exactly remains the same the drilling process what we said ok.

Now you go to the run and look at the run setup, replication parameters are also exactly the warm up period is 0, 480 minutes of the replication length and then every time condition everything is 24 hours ok. Once it is there what you do the next is you basically try to simulate the running of the system. So, what do you do is, you go to this play button and click this ok.

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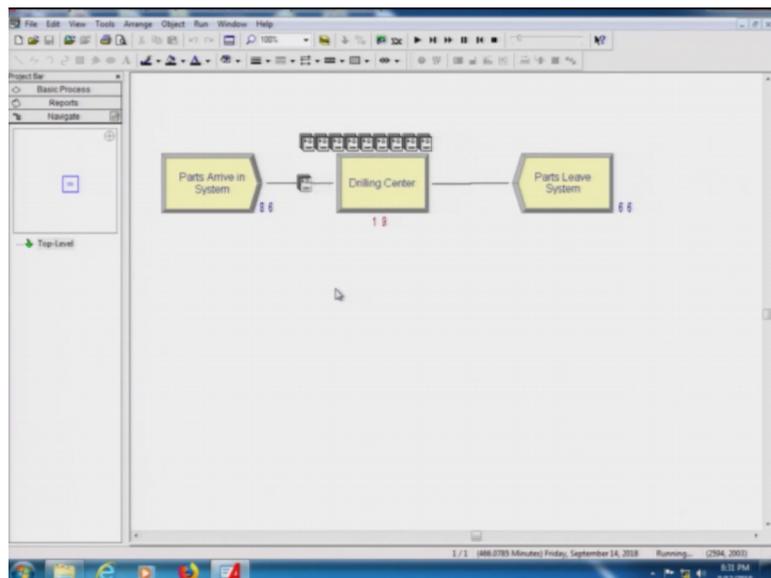
So, what happens if you can see that the parts will arrive and you can see that they are waiting in the drilling queue and you can see that an animation is going on, in which the part is being coming in and going into system.

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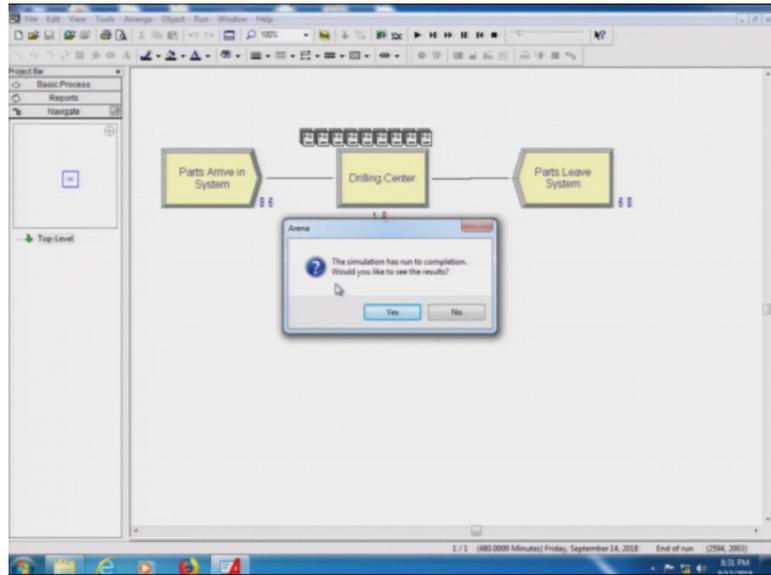
And after some point of time you get a message, that says that simulation has run to completion would you like to see the result and you click yes ok.

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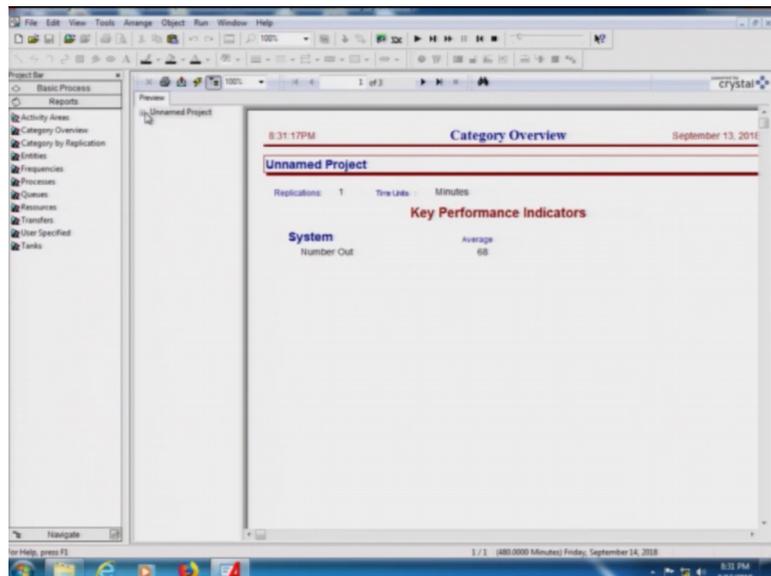
The minute you click yes then a report comes up and this is the report of ARENA, which is typically done with the help of crystal reports actually. And in this the major thing is you can see that the unnamed project we are not name the project yet, but that we can worry about it later.

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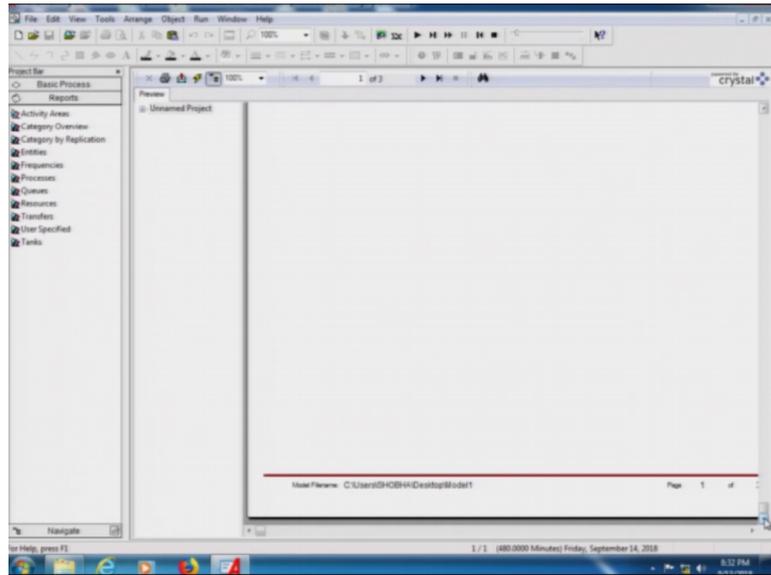
So, one another way to see the report is you scroll down by page ok, there is one way to look into the report another. So, there are three pages. So, the if you click this, go to the next page you will take you to the next page.

So, we go to task manager ARENA is running and I do not want to stop this forcefully quit ARENA and task. And now this problem is very common when you use ARENA in any of your software, I am happy that we are facing this problem now. Because this is very common when most of you would away for gigabyte RAM machine and the problem with the red is such kind of a 4 gigabyte RAM machine will not be a ARENA will actually take a lot of effort in doing this. So, again going back to the same process let us see whether we can even make it happen. We do open this model, open then let me save it once there then I run the simulation quickly ok. So, model is done yes results are shown.

So, let me end this. So, that I might get a little bit of time may see file if I can find a way to save the report ok, but anyway. So, for the time being the first thing it actually shows is the unnamed project, there is one replication time minutes shows in minutes number out 68. So that means, in the 480 minutes for an in 8 hour shift you are able to do what we call as a 68 items arrived into this and you are able to use this 68 ones which are completed the process ok. Now we try to move to the NDT again same problem. So, I will do one thing I will try to change the model the slightly and see whether we can make it slightly simple and then we go from there please bear with me.

Thank you.