

# Foundation to Computer Systems Design

Indian Institute of Technology Madras

Professor V. Kamakoti

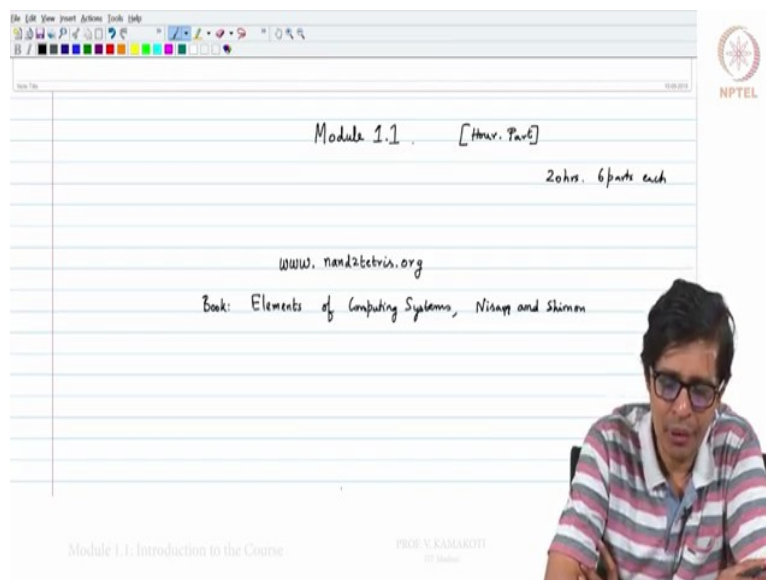
Department of Computer science and Engineering

## Module 1.1 Introduction to the course.

So welcome to this course on foundation to computing systems so this course is for 20 hours duration and we will have 6 parts per hour and so totally 120 part each parts will be approximately 10 minutes so we will follow this nomenclature module hour dot path so this is module 1.1 this is module first hour first part so will go to model 1.2 to 1.6 then 2.1 to 2.6 and so on.

So totally there will be 120 parts each hour 6 parts and each parts going to 10 minutes. In the first part and I will be introducing you to this course I hope you have seen the introduction video I'm not be repeating that again so if you have not seen my introduction video in full please do see that.

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The image shows a presentation slide with a white background and a blue border. The slide contains the following text:

Module 1.1 . [Hour. Part]  
2ohrs. 6parts each

[www.nandabebtris.org](http://www.nandabebtris.org)  
Book: Elements of Computing Systems, Nisan and Shimon

The slide is displayed in a software window with a menu bar (File, Edit, View, Insert, Actions, Tools, Help) and a toolbar. The NPTEL logo is visible in the top right corner. In the bottom right corner, there is a video inset of Professor V. Kamakoti, who is wearing glasses and a striped shirt.

But what we will be following in this course is closely this particular book Elements of computing systems by Nizan and Shimon You can get the details of this book at this

particular website [www.nand2tetris.org](http://www.nand2tetris.org). I'd like to spend a couple of minutes to explain what 2 Tetris is.

All of you know that Tetris is a game, its an application, software. "" you might have studied in your + 2, is actually a Gate it is it is also a Universal Gate meaning that any gate in the world can be actually constructed using gate right. So is a gate. Now what will be doing in this course in 20 hours we attempt to use a gate and build a entire computer and the related software on which you can execute Tetris. You can play the Tetris game so you use a gate which is the basic gate using that gate we build we use several such gates to build a hardware we will write software layers on top of it and finally we will compile and execute a Tetris game on that stimulated hardware so that is why this course is called to Tetris.

I hope this very exciting to you right so in the first module first part of the first module I will be introducing you to this website [www.nand2tetris.org](http://www.nand2tetris.org).

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So if you go to this website this is the homepage and you can see a window here which basically explains you the entire book it also has course materials here.

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The screenshot shows the homepage of nand2tetris.org. The browser address bar displays 'https://www.nand2tetris.org'. The page content includes the following text:

The site contains all the project materials and software tools necessary for building a general-purpose computer system from the ground up.

The materials are aimed at students, instructors, and self-learners. Everything is free and open-source, as long as you operate in a non-profit, educational setting.

The materials also support two courses that we now teach in Coursera: [Nand2Tetris Part I](#) (hardware projects/chapters 1-6), and [Nand2Tetris Part II](#) (software projects/chapters 7-12). These courses are aimed at learners who wish to take the course at their own pace. Here is a [two-minute video promo](#) of Part I of the course.

Nand to Tetris courses are now taught at 100+ universities and high schools around the world. The students who take them range from high school students to Ph.D. students to Google engineers.

Instructors who wish to teach the course can contact [schocken@gmail.com](mailto:schocken@gmail.com) for additional course materials.

A prominent orange button labeled 'Course Materials' is visible below the text.

The NPTEL logo is in the top right corner. At the bottom of the slide, the text 'Module 1.1: Introduction to the Course' and 'PROF. V. KAMAROTTI' is visible.

The screenshot shows the 'Projects' page of nand2tetris.org. The browser address bar displays 'https://www.nand2tetris.org/course'. The page features a navigation menu on the left with the following items: Home, Projects, Book, Software, License, Papers, Cool Stuff, About, and Team.

The main content area is titled 'From Nand to Tetris' with the subtitle 'Building a Modern Computer From First Principles'. Below this, it states: 'The complete Nand to Tetris experience spans 12 projects. Each project consists of project materials, a lecture, and a book chapter:'

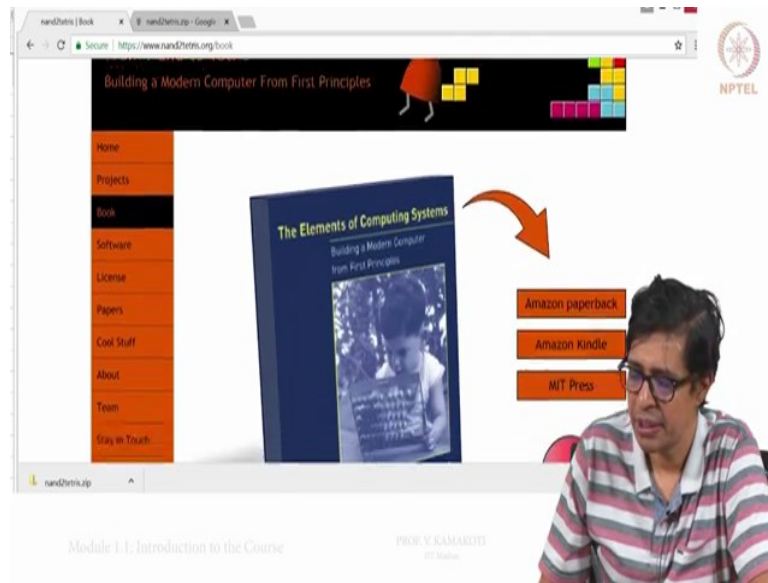
Four project cards are displayed in a grid:

- Project 1: Boolean Logic
- Project 2: Boolean Arithmetic
- Project 3: Sequential Logic
- Project 4: Machine Language

Each card contains icons representing a person, a presentation board, and a book. The NPTEL logo is in the top right corner. At the bottom of the slide, the text 'Module 1.1: Introduction to the Course' and 'PROF. V. KAMAROTTI' is visible.

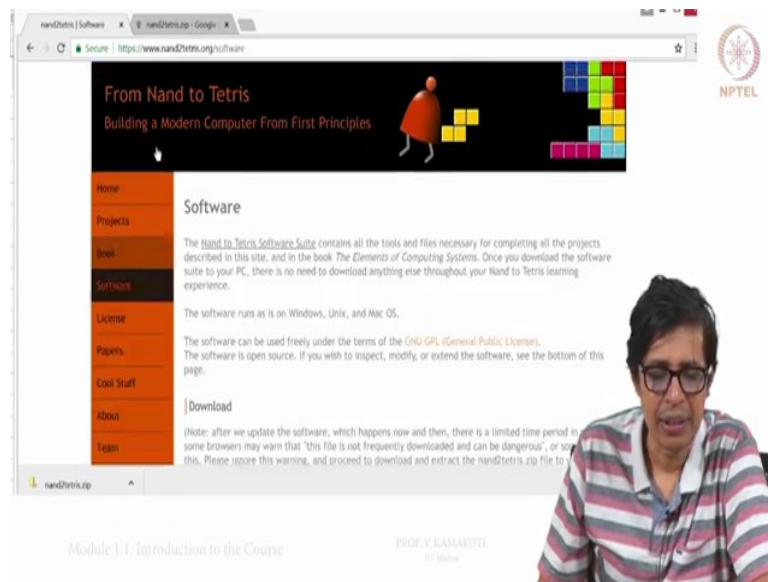
You can look at this course materials where in these are all the 12 different projects are 12 different steps involved in converting or building a complete computer from gate so that is capable of executing the Tetris game and then there are projects these are the projects

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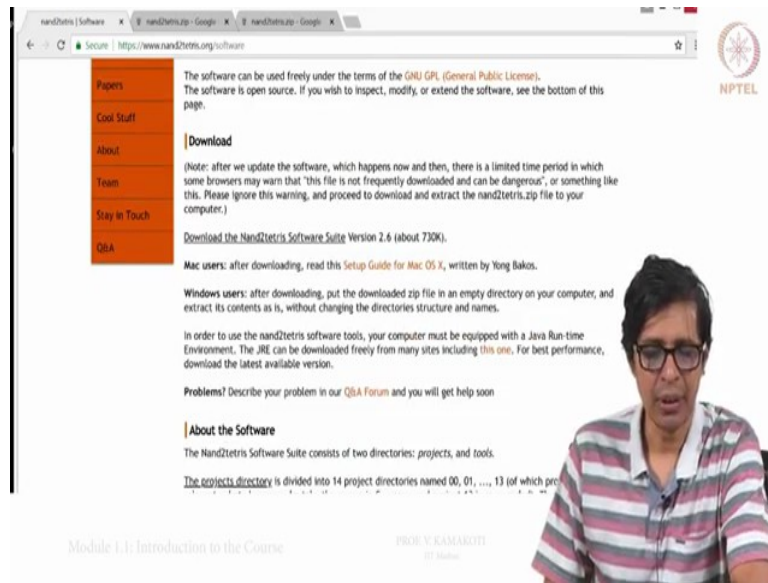
And this is about the book I there is an Amazon paperback, Amazon Kindle and MIT press books are there so you can I strongly suggest that you buy this book because its very useful and you can use this book it will be very exciting thing to read.

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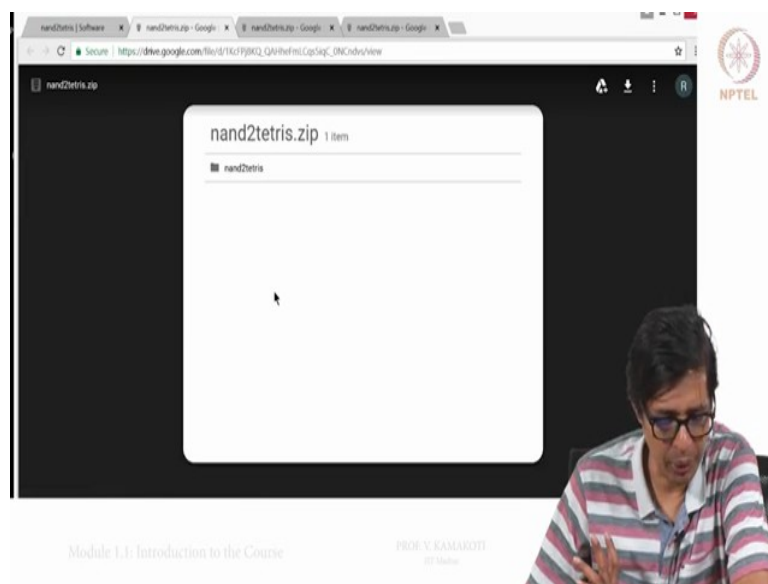
And the entire software that we will be using in this course they are very practical course so everything is in the project has nothing in basically in the lectures that we will be doing the project and so you need to understand this course.

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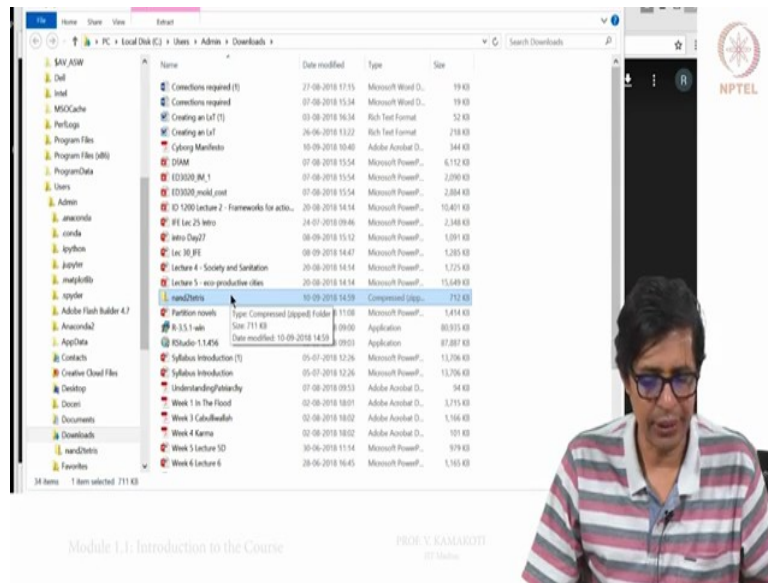
Now we go to this website 2Tetris dot ORG now we now look at the software which we will be using for all the assignments that will be doing this is a very practical course it is extremely dependant on the software and entire course will be based on the software so the software can be executed by on a windows, Unix and MAC OS machine how to execute on the windows and Unix are similar for MAC OS there is a setup guide for MAC OS X that we will be using now I will first go and click this.

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So I am just downloading it so click full download yes so this is downloaded now.

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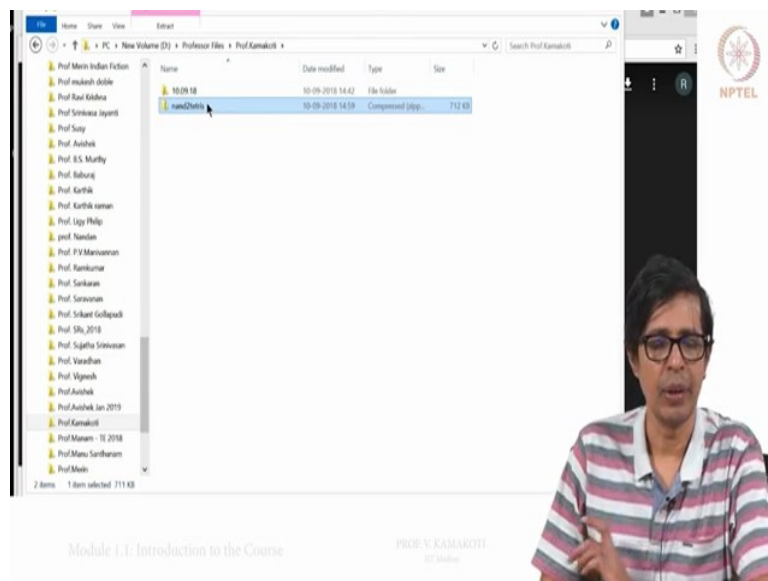
The screenshot shows a Windows File Explorer window with the address bar set to 'Downloads'. The file list is as follows:

Name	Date modified	Type	Size
Connections required (1)	27-08-2018 17:15	Microsoft Word D...	19 KB
Connections required	07-08-2018 15:34	Microsoft Word D...	19 KB
Creating an Lef (1)	01-08-2018 16:34	Rich Text Format	52 KB
Creating an Lef	24-08-2018 11:22	Rich Text Format	218 KB
Cybernetics	10-09-2018 10:40	Adobe Acrobat D...	344 KB
CIAM	07-08-2018 15:54	Microsoft PowerP...	6,112 KB
ED3320_06_1	07-08-2018 15:54	Microsoft PowerP...	2,090 KB
ED3320_mold_jost	07-08-2018 15:54	Microsoft PowerP...	2,884 KB
ID 1200 Lecture 2 - Frameworks for actio...	20-08-2018 14:14	Microsoft PowerP...	10,401 KB
FE Lec 25 Intro	24-07-2018 09:46	Microsoft PowerP...	2,348 KB
intro Day27	08-09-2018 15:12	Microsoft PowerP...	1,091 KB
Lec 30 FE	08-09-2018 14:47	Microsoft PowerP...	1,283 KB
Lecture 4 - Society and Sanitation	20-08-2018 14:14	Microsoft PowerP...	1,725 KB
Lecture 5 - eco-productive cities	20-08-2018 14:14	Microsoft PowerP...	15,649 KB
randDists	10-09-2018 14:59	Compressed (zipp...	712 KB
Partition novels	Type Compressed (zippend) Folder	Microsoft PowerP...	1,414 KB
R.3.5.1-win	Size 711 KB	Application	80,933 KB
Syllabus-1.4.06	Date modified: 10-09-2018 14:59	Application	87,887 KB
Syllabus Introduction (1)	05-01-2018 12:26	Microsoft PowerP...	13,708 KB
Syllabus Introduction	05-01-2018 12:26	Microsoft PowerP...	13,708 KB
Understanding/Intersidely	07-08-2018 09:53	Adobe Acrobat D...	54 KB
Week 1 in The Food	02-08-2018 18:01	Adobe Acrobat D...	3,175 KB
Week 1 Cellularfish	02-08-2018 18:02	Adobe Acrobat D...	1,166 KB
Week 4 Kerne	02-08-2018 18:02	Adobe Acrobat D...	101 KB
Week 5 Lecture 1D	30-04-2018 11:14	Microsoft PowerP...	979 KB
Week 4 Lecture 6	28-04-2018 16:45	Microsoft PowerP...	1,165 KB

Module 1.1: Introduction to the Course  
PROF. V. KAMAROTTI

Now copy this I am just trying to copy.

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The screenshot shows a Windows File Explorer window with the address bar set to 'Downloads'. The file list is as follows:

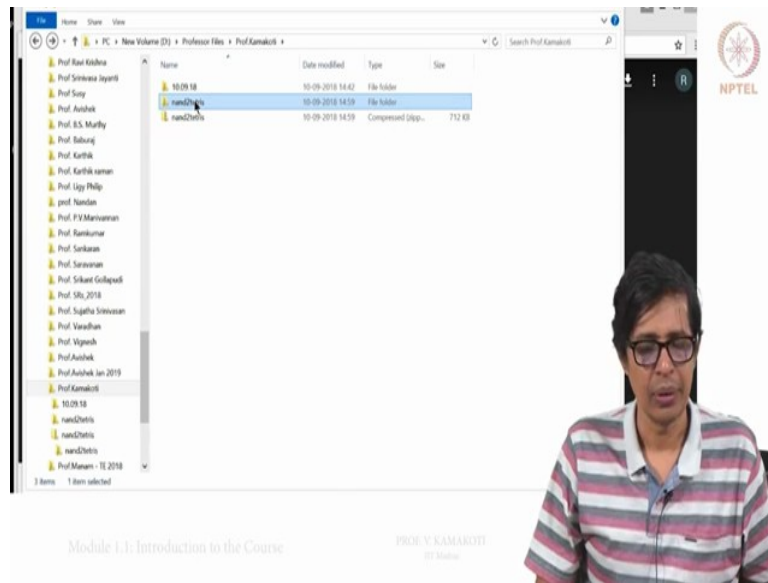
Name	Date modified	Type	Size
10.09.18	10-09-2018 14:42	File folder	
randDists	10-09-2018 14:59	Compressed (zipp...	712 KB

Module 1.1: Introduction to the Course  
PROF. V. KAMAROTTI

And I'm posting it here now I will extract this.

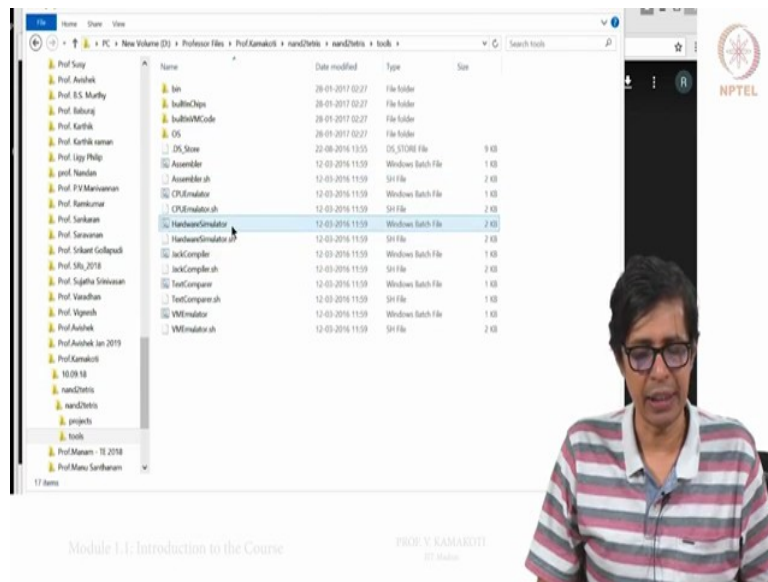


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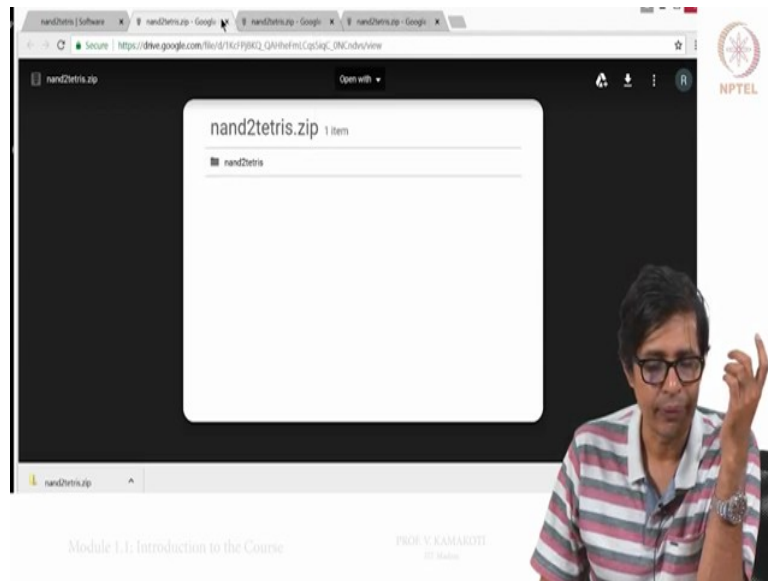
Okay now after extracting I delete the original zip file compress file now I have 2Tetris as a directory now I go into that.

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I click on tools and I get hardware simulator If you are using windows use the hardware simulator Windows batch file. If you are using Linux use hardware simulator dot SH, the shell file if you are using MAC OS please do go to this part.

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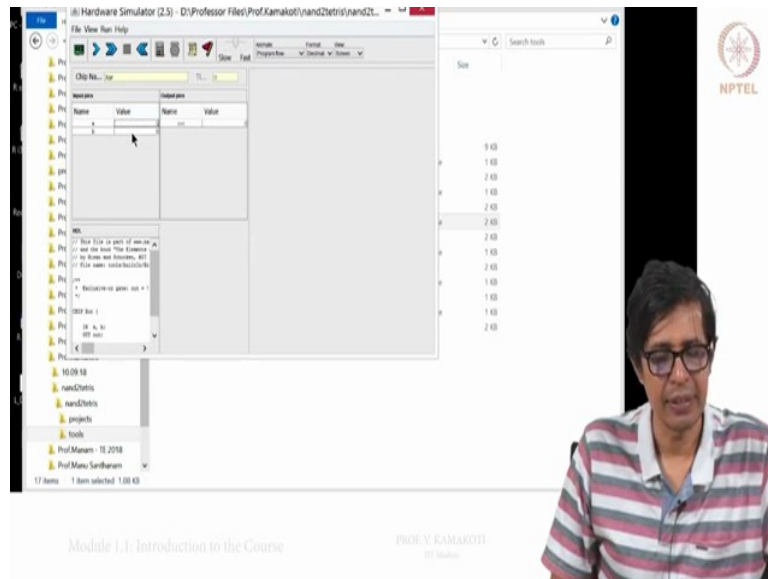


And used this setup guide for Mac OS X as given in the website 2tetris dot org and find out how we can use it.

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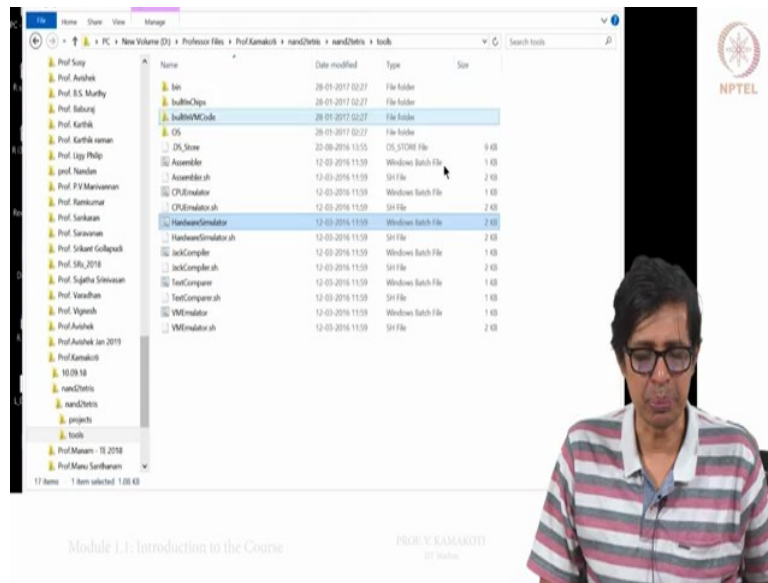




Right so now let us click double click on this and this will open so once the screen opens we sure that your hardware simulator is running right now just to test everything is Pakka we will just load one chip just say file load chip go to built-in chips click on .sdl click load chip now you just go here this is an gate we will be explaining what is an gate shortly just change this to 1.

Click on this A and change it 1 press enter now press this run. The double arrow here checks if this has become 1. Make the B as 1 press that enters key now you press this run here check if this is becoming zero. So these are a very simple test that you can do to basically check whether you are hardware simulator is working.

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So this is pretty much once you have done this I think you have finished the installation of the software very straight forward for any clarification please do a post on the website there is an discussion forum and we will try and answer these questions. Thank you!