[Music]

Welcome to this tenth lecture last lecture for week six and here we will talk about the assignments for the week and some recommendations for further reading. Actually the I changed the setup for the assignments this week I got the feedback that maybe this distinction between questions for video lectures and question for further material is not so easy or no sub meaningful, so I left that so actually now I will go through just roughly the kind of question, assignments I have designed for the video lecture, there will only be assignments for the video lectures. You will get some information for further readings but they will mostly be there because it may be facilitate your learning to have something on top of what's in the videos, but it's not required that you read everything of that in order to answer some questions or do some assignments. Actually I can also say that at this point that for the final exam I will I've thought about how to prepare you for that, so actually I reallocated some material so for the 1/2 I would say of the last week of this course, I will have a repetition session where I will systematize and collect all the problem oriented tasks that occurred on all the weeks and go through that with you and actually all problems solving tasks on the final exam will be within the realm of what is set up in this repetition, so actually one can say also that you will only get problem solving tasks based on what has been covered in the video lectures. I will also go through all the material recommended for all week and make a selection from that and recommend you a subset of that and then it can happen that you get recall questions based on those readings so this is my current setup for your final exam.

I will now shortly comment on the different questions and as for few of the earlier weeks, I try to characterize the question in terms of which lecture or sub area that they relate to, so there will be two questions on the first lecture on fundamentals, I would say they are more or less of a recall character so let's leave them, the next question will be related to the lecture on perceptrons and actually the questions relate to the weight updating mechanism on the perceptron and as you I hope you remember and this question very closely a couple or two examples handled on the lecture. So question four is pretty similar, it is just there to highlight the fact that the machinery for a single neuron in general feed-forward network is not identical and to the one in the person of the perceptron Machinery is simple so the outcome of a typical excitation of a neuron of those cases become different, but also here your task is very much related on what was covered on the

lecture. And similarly the question 5 is related to the learning mechanism of backpropagation on the lecture of feed forward multi-layer networks also related to the key adaption of the weights, you may think these questions are pretty nitty-gritty but the intention with having this question is to force your little to really look in details how weight updating takes place which is the key of learning in this area. So after that we turn to recurrent neural networks and first you will just get the question on the relation to some applications for the area, and a few more recall questions you may remember that the vanishing gradient problem is an important problem for this kind of network, so it's a key issue how to handle that and which of course indirectly which of the different approaches particular target that is use. The one version of recurrent network is the LSTM which is very much used model today in practice, so I also want you to look a little more it's not an easy area, I hope you remember that from lecture but I really want you to look at more thoroughly on the detail mechanism there so this this question is there to trigger your interest in LSTM. Then we leave that and go to associative memory, so on the sum as the other questions the focus on the assignment here is on the updating of weights but in that different fashion than what you find in the feed-forward networks and there is a follow-up question on associative memory or more general character and then in the end we go to Hopfield networks and also there you can find an exercise of updating character. Finally we have a few questions on convolutional Network first one on what convolution is actually which is good to know if you're going to understand that area and learning question writing to the some ingredients of this method and finally one question regarding the source of the inspiration. So these are the questions for this week.

We will now turn to the further readings and essentially the readings here are our little mix of old and new, there are a few original references actually some of the key works are McCulloch, Pitt, Hebb, Hubel, Rosenblatt etc., they're also some newer work describing giving an overview or current work in deep learning but also on the specifically on long-short term memory and Hopfield networks. So but as I said earlier these readings are there for your service and you don't actually need to read them to answer the assignments for the week however they may help you in actually some a subset of these will then also in the current in the final collection of readings for the exam where you may have to answer recall questions for this set. This was the end of this final lecture for weeks 6. Thanks for your attention the next week of the course will have the

following in combined theme, on one hand tools for implementation and on the other hand some comments on interdisciplinary inspiration for the machine learning field thank you.