1. **Show that your choice for the kernels width is sensible, i.e. it gives more weight to closer points. Discuss why your definition of closeness is reasonable.**

   As we choose different value of h, we found that the higher the value of h is, the lesser the effect of kernel will be. If we choose a higher value of h, there will be more points considered in our prediction. So we choose a reasonably smaller value of h, so as to give more weight to closer points to get a good prediction.

   To be specific, we choose 80 km for width of distance kernel, depending on the distance between Linkoping and nearby cities;

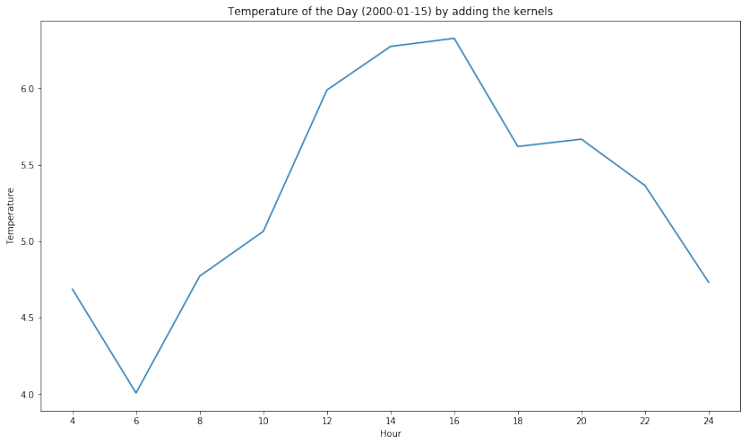
   For the date kernel we choose 7 days, since the weather forecast usually can gives 7 days forecast;

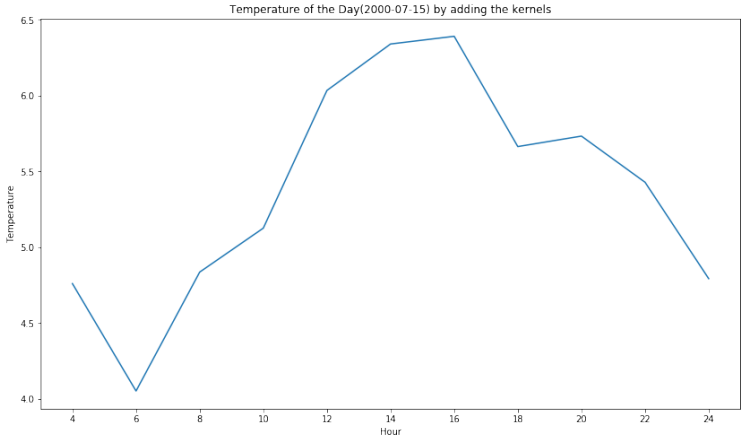
   For the time kernel we choose 3 hours, since the last 3 hours should have a closer temperatures as the current time.

2. **It is quite likely that the predicted temperatures do not differ much from one another. Do you think that the reason may be that the three Gaussian kernels are independent one of another? If so, propose an improved kernel, e.g. propose an alternative way of combining the three Gaussian kernels described above.**

   The plots of prediction of the temperature on ”2000-01-15” and ”2000-07-15” are shown as below. The results are predicting by summing up three Gaussian kernels as the lab introduction says. We can see that the temperatures with in a day do not vary much. And even comparing two different days, the temperature are almost the same, which is definitely wrong.

   This result may cause by the way we sum up three independent kernels. And in this situation, when the distance difference and date difference is large, but the time difference is small, the time alone will also effect the prediction a lot when we just adding the kernels. And the poor prediction is because of the kernels are independent.





To improve the prediction, we combine the kernels by taking production. And the predicted temperature plots for the same days are shown as following. As we can see here, the temperatures of ”2000-01-15” are around 0, and the temperatures of ”2000-07-15” are around 14. The temperature between two days are different, which obeys the fact. Compared with the situation above, this method is better.