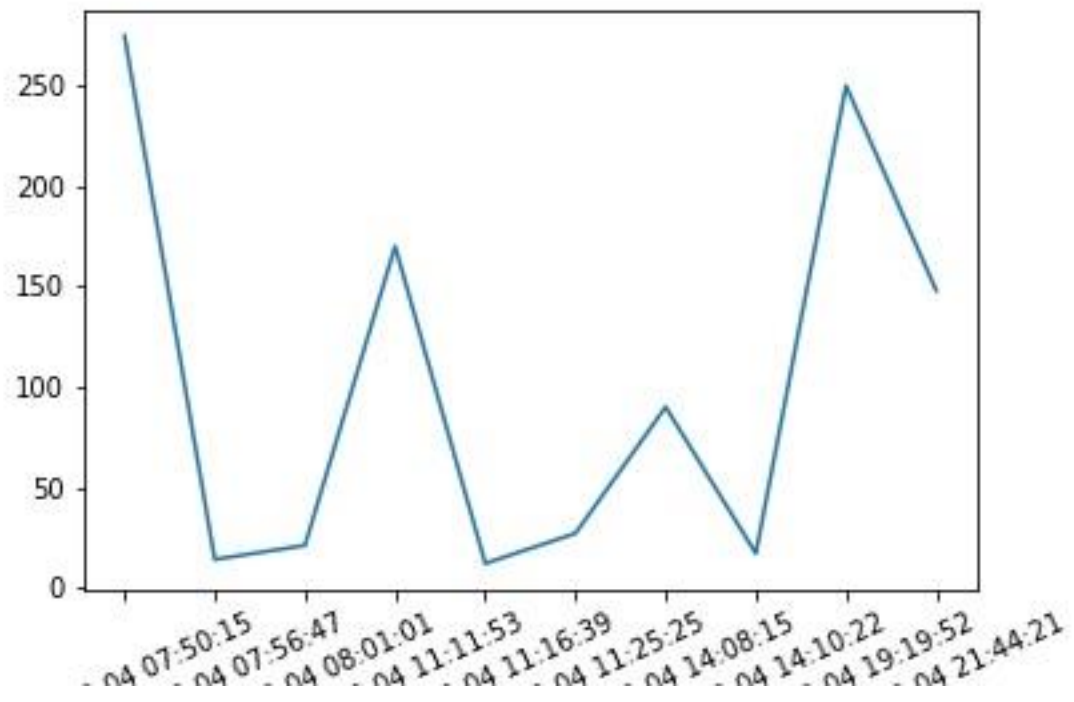
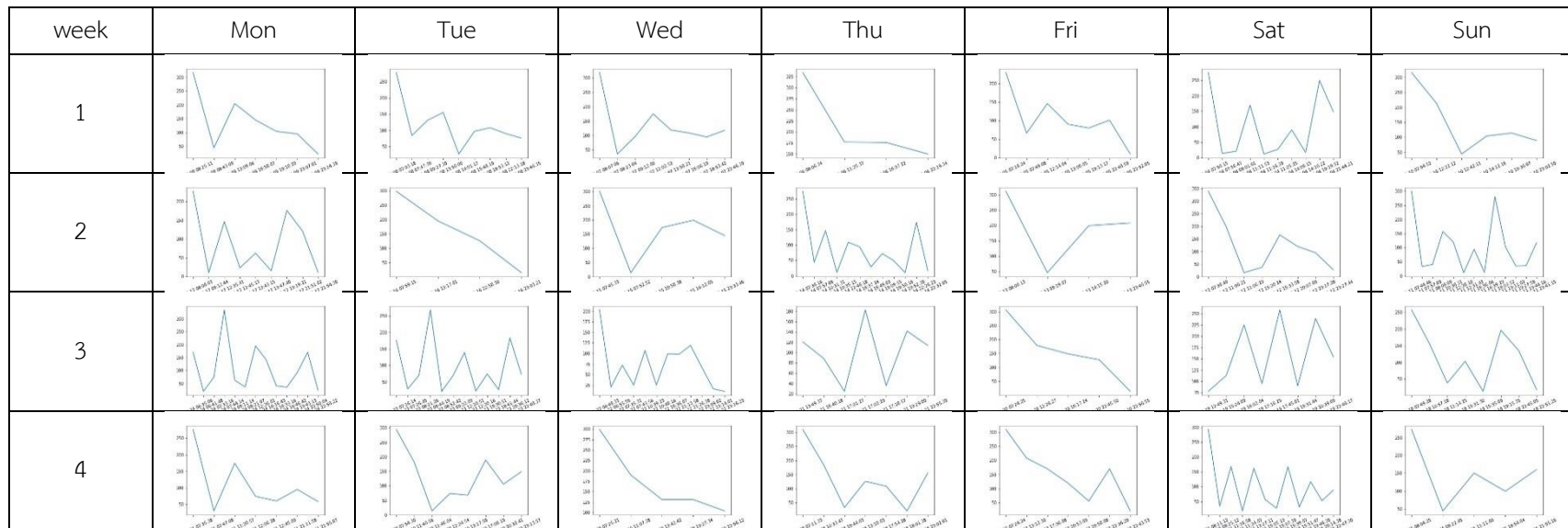


### Exercise 3 Task 1 and Task 2



Picture 1 example line graph between time information and duration of kettle usage

**Table 1** data of a kettle consumption for one month



The table illustrates line graphs which contain datasets of the kettle usage duration in a single occupancy house for a month. The line graphs were compared by week. The X axis represents time information, while the Y axis represent the amount of time it took for that period.

Generally, there was a long period of the kettle usage in every morning and tended to decrease over the time of day, although there were some days which had overview of using the kettle all day, such as, Saturday and Sunday. The period of the kettle usage in the morning could be interpreted that this was the kettle usage for breakfast since it occurred everyday in the period from 7 am to 8.15 am, approximately. In general, on weekdays, the kettle was frequently used again at noon. This could be considered as kettle usage for preparing to have a lunch. In some days during weekdays, usage of kettle occurred at evening, but it could not be interpreted what was happening.

In weekend, the data showed that usage of kettle occurred almost whole day from 7am to 10pm, approximately. Usage of the kettle occurred frequently in morning, noon, and early evening, except on 2<sup>nd</sup> Saturday. On Sunday, there were usage of kettle in every morning, which could be also considered as breakfast, although the behavior of kettle usage was weird at other time.

However, the details mentioned above, it was interpretation that overlooks some information, such as, the data of 3<sup>rd</sup> Monday and Tuesday. The data of 3<sup>rd</sup> Monday and Tuesday showed that the kettle usage occurred almost whole day like on Saturday. This was considered as strangeness of this dataset. The behavior of the kettle usage of these two days were strange from other days. Nevertheless, this strangeness was noticed from researcher, not the use of algorithms. So, if anomaly algorithms, including, one-class svm, isolation forest, and local outlier factor, were used for analysis, it would improve an accuracy of detection.

To conclude, there was frequently the kettle usage in the morning of everyday, which was considered as preparing for breakfast. In weekdays, the kettle usage occurred again at noon, which was interpreted as preparing for lunch. The kettle usage at other time as well as on weekend could be hardly interpreted what activity was being happened.