

Assignments

Python & Machine Learning

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# Assignment 1 – Python Assessment

## File

<http://www.kepcorp.com/annualreport2018/pdf/keppel-corporation-limited-annual-report-2018.pdf>

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While pursuing new markets and opportunities, we are growing our stable and recurring income from the quality operations and maintenance services provided by Infrastructure Services.

Keppel Electric has been the largest electricity retailer in Singapore in terms of market share in the commercial and industrial sector. Following the launch of the Open Electricity Market (OEM) in Singapore, Keppel Electric is also making headway into the housing electricity market. Starting from 1 November 2018, the OEM is being progressively extended to all consumers across Singapore by zones. The response to Keppel Electric's retail offerings for households has been encouraging, with preliminary results showing that it is among the retailers with the largest market shares in the OEM.

Keppel T&T is scaling up its logistics and data centre solutions to tap opportunities created by the fast-growing digital economy. With the burgeoning growth of cloud service providers as well as increasing storage and processing requirements, our data centre business is well positioned to tap growth opportunities.

In 2018, we added four new data centre projects across Asia and Europe to our portfolio. This expands our portfolio to 22 data centres with a total value of about S\$2 billion. To further grow its capabilities, Keppel T&T is also exploring innovative solutions such as high-rise green data centres and floating water-cooled data centre parks, which tap Keppel O&M's expertise in floating infrastructure.

Expanding into new markets, we have, through the Alpha Data Centre Fund (Alpha DC Fund) and Keppel Data Centres Holding (KDC), signed conditional agreements with the Salim Group to jointly develop and operate a high-availability data centre in Bogor, about 35 kilometres from Jakarta. Alpha DC Fund and KDC have also made agreements with a leading technology company to develop and operate their first greenfield data centre in Johor, Malaysia. Meanwhile, Keppel Logistics focused on streamlining processes and resources for better cost management while seeking new opportunities in urban logistics. We continued to drive the growth of UrbanFox, our omnichannel logistics and channel

for long-term growth, including expanding into new markets and asset classes, focusing on areas which harness the capabilities of the Keppel Group.

With a view to tapping opportunities in the fast-growing senior living market, Keppel Capital entered into a conditional equity purchase agreement to acquire a 50% stake in leading US senior living operator, Watermark Retirement Communities. It has also signed Memoranda of Understanding (MOUs) to establish new private funds to invest in education real estate, and retail properties in Australia.

Our listed REITs and Trust have also been expanding their portfolios. In Australia, Keppel DC REIT is enlarging its data centre footprint with a new dual and core data centre, to be built in the Macquarie Business Park precinct in Sydney. In the US, Keppel-K&S US REIT continued to capture strong leasing demand from the technology and professional services sectors in Seattle. Keppel Infrastructure Trust has completed its acquisition of a 100% interest in Iom, which is among the leading industrial infrastructure businesses in Australia and New Zealand, supplying and distributing water treatment chemicals, as well as industrial and specialty chemicals.

2018 also marked the 10<sup>th</sup> anniversary of the Sino-Singapore Tianjin Eco-City, a Sino government-to-government project between China and Singapore. With the Eco-City's growing maturity, we are seeing increasing demand for homes and land in the city. Our joint venture, the Sino-Singapore Tianjin Eco-City Investment and Development Co., Ltd., sold three residential land plots for RM6.34 billion in 2018, one of which was acquired by Keppel Land to tap the healthy demand for its green homes in the Eco-City.

Leveraging the Group's strong track record in master development, Keppel Urban Solutions (KUS) continues to make good progress in its pilot project, the 44-hectare Saigon Sports City in HCMC, which is being developed in collaboration with



## Objective

Extract text blocks from a PDF document with each paragraph as a separate line and text being in reading order going from first column from top to bottom and then into second column and then third column. Dump the output in an excel file.

## Resources & Hints

PyMuPDF – PDF Parsing library

Identify columns by looking at the x coordinates difference

OpenCV can be used to combine lines using contours

## Submission

Create a github repo, upload the code and the generated output excel along with requirements.txt and share the link.

# Assignment 2 – Deep Learning Inferencing

## File

<http://www.kepcorp.com/annualreport2018/pdf/keppel-corporation-limited-annual-report-2018.pdf>

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In FY 2018, as well as the attendance of each Board member at these meetings, are disclosed in the table below.

If a director were unable to attend a board or board committee meeting, he/she would still receive all the papers and materials for discussion at that meeting. He/she would review them and advise the Chairman or board committee chairman of his/her views and comments on the matters to be discussed so that they may be conveyed to other members at the meeting.

**Internal Limits of Authority:** The Company has adopted internal guidelines setting forth matters that require board approval. Under these guidelines, all transactions exceeding \$150 million by any Group company (not separately listed) require the approval of the Board. For transactions between \$50 million and \$150 million, MRAC will determine if Board approval is required, depending on the individual considerations for each case. Each Board member has equal responsibility to oversee the business and affairs of the Company. Management on the other hand is responsible for the day-to-day operation and administration of the Company in accordance with the policies and strategy set by the Board.

**Director Orientation:** A formal letter is sent to newly-appointed directors upon their appointment explaining their roles, duties, obligations and responsibilities as a board director. All newly-appointed directors receive a director toolkit and undergo a comprehensive orientation programme which includes site visits and management presentations on the Group's businesses, strategic plans and objectives.

**Training:** The directors are provided with continuing education in areas such as directors' duties and responsibilities, corporate social responsibility, financial reporting standards, changes in the regulatory environment, etc. The training programme is also in place for directors in areas such as accounting, finance, risk governance and management, the roles and responsibilities of a director of a listed company and industry specific matters. In FY 2018, some ICD directors attended talks on topics relating to corporate governance and ethics (including case studies), cybersecurity governance, health safety and environment (HSE) performance, and macroeconomic trends. Stock visits are also conducted periodically for directors to familiarise them with the operations of the various businesses so as to enhance their performance as board or board committee members.

**Board Composition and Succession Planning**  
Principle 2:  
Strong and independent element on the Board

**Board Composition and Succession Planning:** To discharge its oversight responsibilities, the Board must be an effective board which can lead and control the business of the Group. There is a process of refreshing the Board progressively over time so that the experience of longer serving directors can be drawn upon while tapping

into the new external perspectives and insights which more recent appointments bring to the Board's deliberation. Please refer to page 73 of this report for details on the process.

**Board Independence:** The ICD determines on an annual basis whether or not a director is independent. In January 2019, the ICD carried out the review on the independence of each non-executive director based on the respective directors' self-declaration in the Directors' Independence Checklist and their actual performance on the Board and board committees, taking into account the recent amendments to listing rules on the circumstances in which a director will not be deemed independent and guidance in the 2018 CG Code as to the circumstances in which a director should not be deemed independent.

In this connection, the ICD (save for Mr Alvin Yeo who abstained from deliberation in this matter) noted that Mr Alvin Yeo is Senior Partner of WongPartnership LLP, which is one of the law firms providing legal services to the Group. Mr Yeo had declared to the ICD that although he is a partner with a 5% or more stake in WongPartnership LLP, he did not involve himself in the selection and appointment of legal advisers for the Group, and that he supported the selection of legal advisers based on assessment of quality, and for their remuneration to be based on market rate. In addition, the ICD noted that Keppel Infrastructure (KI) management had, of their own accord, appointed Mr Yeo as lead counsel to represent KI in its arbitration proceedings with the State of Qatar in relation to the Qatar South West Gas Management Centre project, based on merit and taking

Board and Committee Meetings and Attendance						
	Board Meetings	Board Committee Meetings				
		Audit	Nominations	Remuneration	Safety	Risk
Lee Boon Yang	11	–	3	4	4	–
Loh Chin Han	11	–	–	–	4	–
Tan Heng Tan	8	–	3	2	–	4
Alvin Yeo Khim Hai	9	5	1	–	–	–
Tan G. Ha	9	5	–	–	4	4
Darryl Teoh	10	5	–	4	–	4
Tan Pui Lay Chiang <sup>1</sup>	10	–	3	–	4	4
Tan Veetling	11	–	3	–	–	–
Veronica Eng	11	5	–	–	–	4
Jean-François Mancini <sup>2</sup>	3 out of 3	–	–	–	–	–
No. of Meetings Held	11	5	3	4	4	4

<sup>1</sup> Mr Tan Pui Lay Chiang ceased to be a member of the Board Risk Committee with effect from 3 January 2019.  
<sup>2</sup> Prof. Jean-François Mancini was appointed to the Board as a non-executive and independent director with effect from 1 October 2018, and was appointed as a member of the Board Risk Committee on 2 January 2019.

## Objective

Detect and locate tables inside a page using DNN, then parse the table to extract a dataframe that should not lose any information and structure of the table. The output should be an excel file containing the extracted table.

## Resources & Hints

Camelot-py – Table parsing library

Cascadetabnet – A pre-trained DNN for table detection available on github

## Submission

Create a github repo, upload the code and the generated output excel along with requirements.txt and share the link.

## Assignment 3 – NLP Training

### Files

The dataset can be downloaded from here:

<https://groups.csail.mit.edu/sls/downloads/restaurant/restauranttrain.bio>

### Objective

Train a named entity recognition model to identify the various entities present in the database. The final input will be a text string and the program should output all the named entities along with the entity text in dictionary format.

### Resources & Hints

Spacy NLP

RASA NLP

### Submission

Create a github repo, upload the code along with requirements.txt and share the link. The code should either use argparse to pass text as input or should have a callable function in which the text can be passed and it return the entities,