

## table\_iii\_iv

April 28, 2021

```
[1]: import json
import sys
import glob
import pandas as pd
import seaborn as sns
import matplotlib as mpl
import matplotlib.pyplot as plt
import numpy as np
from IPython.display import display, Markdown

[2]: DIR = "/home/claudio/hdd/git/bachelorThesis/table_iii/"

[3]: NAMES = {-1: "No termination", 0: "SUBMIT", 1: "QUEUE", 2: "ENABLE",
              3: "SCHEDULE", 4: "EVICT", 5: "FAIL", 6: "FINISH",
              7: "KILL", 8: "LOST", 9: "UPDATE_PENDING", 10: "UPDATE_RUNNING"}

def rename(df, new, old):
    df.rename(columns={old: new}, inplace=True)

[4]: display(Markdown("# Table III"))
for cluster in "abcdefgh":
    df = pd.read_csv(glob.glob(DIR + "/table-iii-" + cluster + ".csv/"
    ↪part-00000-*")[0])
    rename(df, "# Evts. mean", "mean")
    rename(df, "# Evts. 95% p.tile", "%95")

    for i in [-1,4,5,6,7,8]:
        df.loc[df.task_term == i, "task_term"] = NAMES[i]
        rename(df, "# " + NAMES[i] + " Evts. mean", "avg_count_" + str(i))
    for i in [0,1,2,3,9,10]:
        del df["avg_count_" + str(i)]
    rename(df, "Task termination", "task_term")
    display(Markdown("### Cluster " + cluster.upper()))
    display(df)
```

### 1 Table III

### 1.0.1 Cluster A

Task termination	# Evts.	95% p.tile	# Evts.	mean	# EVICT	Evts.	mean \
0 KILL		58.0		27.395925			2.349579
1 FINISH		9.0		12.405370			0.019321
2 FAIL		108.0		50.039556			0.287778
3 LOST		7.0		8.847145			0.083348
4 EVICT		2924.0		428.550689			73.693595
5 No termination		84.0		14.818523			0.000000

# FAIL	Evts.	mean	# FINISH	Evts.	mean	# KILL	Evts.	mean \
0		0.213859		0.003412				3.395996
1		0.003779		2.153432				0.008150
2		11.061864		0.002098				0.467656
3		0.001821		0.384190				1.329910
4		0.768553		0.000179				28.766164
5		0.000000		0.000000				0.000000

# LOST	Evts.	mean
0		0.089576
1		0.008989
2		0.053144
3		1.007933
4		0.845501
5		0.000000

### 1.0.2 Cluster B

Task termination	# Evts.	95% p.tile	# Evts.	mean	# EVICT	Evts.	mean \
0 KILL		60.0		40.901041			3.351496
1 FINISH		20.0		17.277596			0.020444
2 FAIL		260.0		86.772419			0.518061
3 LOST		14.0		25.690455			0.257231
4 EVICT		1578.0		345.705559			64.816518
5 No termination		32.0		13.018130			0.000000

# FAIL	Evts.	mean	# FINISH	Evts.	mean	# KILL	Evts.	mean \
0		0.276305		0.003656				5.541079
1		0.020628		2.942579				0.011640
2		19.656798		0.000560				0.675392
3		0.007420		1.928351				3.515436
4		0.240214		0.000000				17.961539
5		0.000000		0.000000				0.000000

# LOST	Evts.	mean
0		0.033457
1		0.016278
2		0.088523

3	2.015153
4	1.028401
5	0.000000

### 1.0.3 Cluster C

Task termination	# Evts.	95% p.tile	# Evts.	mean	# EVICT	Evts. mean	\
0	KILL	32.0	24.230887			1.533237	
1	FINISH	18.0	15.242628			0.017929	
2	FAIL	156.0	187.030894			0.772823	
3	LOST	28.0	22.385446			0.411365	
4	EVICT	1748.0	404.108669			73.715527	
5	No termination	96.0	21.315166			0.000000	

# FAIL	Evts. mean	# FINISH	Evts. mean	# KILL	Evts. mean	\
0	0.116082	0.003994		3.799111		
1	0.012701	2.470654		0.006020		
2	48.445773	2.035378		0.756015		
3	0.007569	1.412201		2.751353		
4	1.812816	0.000166		22.908022		
5	0.000000	0.000000		0.000000		

# LOST	Evts. mean
0	0.013670
1	0.006414
2	0.133687
3	1.998665
4	0.546198
5	0.000000

### 1.0.4 Cluster D

Task termination	# Evts.	95% p.tile	# Evts.	mean	# EVICT	Evts. mean	\
0	KILL	32.0	29.953873			1.960134	
1	FINISH	18.0	23.105615			0.058651	
2	FAIL	269.0	228.004975			0.496316	
3	LOST	20.0	17.065721			0.014760	
4	EVICT	1478.0	323.366130			62.000510	
5	No termination	103.0	27.867403			0.000000	

# FAIL	Evts. mean	# FINISH	Evts. mean	# KILL	Evts. mean	\
0	0.150521	0.002385		4.682411		
1	0.019051	3.789050		0.009785		
2	58.968210	0.809520		2.040396		
3	0.003577	0.079289		4.636283		
4	0.700268	0.000373		14.057514		
5	0.000000	0.000000		0.000000		

	# LOST Evts. mean
0	0.016156
1	0.018699
2	0.324754
3	1.999794
4	0.627592
5	0.000000

### 1.0.5 Cluster E

Task termination	# Evts.	95% p.tile	# Evts. mean	# EVICT Evts. mean \
0	KILL	258.0	55.877475	1.287917
1	FINISH	14.0	11.976806	0.013879
2	FAIL	138.0	450.526937	0.457703
3	LOST	14.0	11.899908	0.000000
4	EVICT	310.0	84.645189	11.780754
5	No termination	34.0	7.349165	0.000000

	# FAIL Evts. mean	# FINISH Evts. mean	# KILL Evts. mean \
0	0.056909	0.000185	12.159880
1	0.008435	1.998677	0.008241
2	111.471047	0.000000	0.455705
3	0.000000	0.033976	3.131007
4	0.106119	0.000090	5.790960
5	0.000000	0.000000	0.000000

	# LOST Evts. mean
0	0.054997
1	0.026641
2	0.187991
3	1.792164
4	0.654955
5	0.000000

### 1.0.6 Cluster F

Task termination	# Evts.	95% p.tile	# Evts. mean	# EVICT Evts. mean \
0	KILL	162.0	45.039557	0.384065
1	FINISH	20.0	19.899709	0.019381
2	FAIL	220.0	164.043073	0.279352
3	LOST	36.0	25.002219	0.011815
4	EVICT	510.0	302.262347	23.973621
5	No termination	24.0	7.784905	0.000000

	# FAIL Evts. mean	# FINISH Evts. mean	# KILL Evts. mean \
0	0.098430	0.001178	9.804287
1	0.003510	3.007839	0.097934
2	39.257407	0.000023	1.549795

3	0.000909	0.149586	7.283534
4	0.192394	0.000094	45.979997
5	0.000000	0.000000	0.000000

# LOST Evts. mean

0	0.037783
1	0.023707
2	0.203997
3	2.000428
4	0.374789
5	0.000000

### 1.0.7 Cluster G

Task termination	# Evts.	95% p.tile	# Evts. mean	# EVICT Evts. mean \
0 KILL	641.00	130.054143	6.909204	
1 FINISH	18.00	105.240418	0.015228	
2 FAIL	40.00	40.121553	0.016111	
3 LOST	4602.25	576.384120	1.931330	
4 EVICT	2015.00	555.574743	77.429054	
5 No termination	30.00	9.503553	0.000000	

# FAIL Evts. mean # FINISH Evts. mean # KILL Evts. mean \

0	0.135073	0.000033	25.275769
1	0.001655	14.153775	0.004879
2	8.592728	0.000000	0.338883
3	0.360515	48.094421	35.596567
4	0.303127	0.000000	58.299330
5	0.000000	0.000000	0.000000

# LOST Evts. mean

0	0.131106
1	0.158300
2	0.011310
3	3.534335
4	0.653819
5	0.000000

### 1.0.8 Cluster H

Task termination	# Evts.	95% p.tile	# Evts. mean	# EVICT Evts. mean \
0 KILL	388.0	74.425542	0.633338	
1 FINISH	22.0	23.978294	0.023700	
2 FAIL	487.0	170.153701	0.600483	
3 LOST	386.4	94.666667	1.493333	
4 EVICT	206.0	75.658064	6.732544	
5 No termination	18.0	8.123506	0.000000	

	# FAIL Evts. mean	# FINISH Evts. mean	# KILL Evts. mean	\
0	0.169666	0.000231	17.172624	
1	0.014129	3.632529	0.011111	
2	37.599942	0.000000	2.866647	
3	2.400000	0.573333	14.040000	
4	0.837154	0.000000	7.164722	
5	0.000000	0.000000	0.000000	

  

	# LOST Evts. mean
0	0.062799
1	0.028482
2	0.343806
3	3.480000
4	0.421745
5	0.000000

```
[5]: display(Markdown("# Table IV"))
for cluster in "abcdefgh":
    df = pd.read_csv(glob.glob(DIR + "/table-iv-evts-" + cluster + ".csv/
↳part-00000-*")[0], header=None,
                    names=["term"] + [str(i) for i in range(0,11)])
    df2 = pd.read_csv(glob.glob(DIR + "/table-iv-tasks-" + cluster + ".csv/
↳part-00000-*")[0], header=None,
                    names=["term", "# Tasks mean", "# Tasks 95% p.tile"])
    df["term"] = df["term"].astype(int)
    df2["term"] = df2["term"].astype(int)
    df.sort_values(by="term", inplace=True)
    df2.sort_values(by="term", inplace=True)

    df = df2.merge(df, on="term", how="outer")

    rename(df, "# Evts. mean", "mean")
    rename(df, "# Evts. 95% p.tile", "%95")

    for i in [-1,4,5,6,7,8]:
        df.loc[df.term == i, "term"] = NAMES[i]
        rename(df, "# " + NAMES[i] + " Evts. mean", str(i))
    for i in [0,1,2,3,9,10]:
        del df[str(i)]
    rename(df, "Job termination", "term")
    display(Markdown("### Cluster " + cluster.upper()))
    display(df)
```

## 2 Table IV

### 2.0.1 Cluster A

Job termination	# Tasks	mean	# Tasks	95% p.tile	# EVICT	Evts. mean	\
0 No termination	92.359436		174.3		23.263951		
1 EVICT	-1.000000		-1.0		NaN		
2 FAIL	90.792728		499.0		0.694942		
3 FINISH	1.187092		1.0		0.004696		
4 KILL	16.533171		10.0		1.045419		
5 LOST	223.206593		1689.6		0.000000		

# FAIL	Evts. mean	# FINISH	Evts. mean	# KILL	Evts. mean	\
0	3.454474	23.047597		34.565608		
1	NaN	NaN		NaN		
2	0.683556	0.085957		1.849587		
3	0.001341	1.072623		0.024396		
4	0.073867	0.461387		1.188720		
5	0.000000	0.000000		1.034082		

# LOST	Evts. mean
0	0.707709
1	NaN
2	0.009730
3	0.000952
4	0.044610
5	0.974598

### 2.0.2 Cluster B

Job termination	# Tasks	mean	# Tasks	95% p.tile	# EVICT	Evts. mean	\
0 No termination	112.422759		169.8		34.681161		
1 EVICT	1.000000		1.0		1.000000		
2 FAIL	74.367804		374.0		2.003355		
3 FINISH	6.304299		10.0		0.022380		
4 KILL	69.853370		234.0		1.696449		
5 LOST	320.020202		459.8		0.000000		

# FAIL	Evts. mean	# FINISH	Evts. mean	# KILL	Evts. mean	\
0	0.711242	13.379533		38.794188		
1	0.000000	0.000000		0.000000		
2	1.993765	0.266584		4.944145		
3	0.008476	2.349304		0.012729		
4	0.157833	0.613748		3.008678		
5	0.000000	0.000000		2.959946		

# LOST	Evts. mean
0	0.780483
1	0.000000
2	0.034526

3	0.006484
4	0.012092
5	1.996875

### 2.0.3 Cluster C

Job termination	# Tasks	mean	# Tasks	95% p.tile	# EVICT	Evts. mean	\
0	No termination	96.399561		100.0		55.276973	
1	EVICT	1.000000		1.0		1.000829	
2	FAIL	41.982301		200.0		3.483606	
3	FINISH	1.991485		1.0		0.021806	
4	KILL	110.680808		652.0		0.627334	
5	LOST	38.870091		48.6		0.000031	

# FAIL	Evts. mean	# FINISH	Evts. mean	# KILL	Evts. mean	\
0	7.552906	23.848867		41.578669		
1	0.000000	0.000000		0.000415		
2	0.997592	0.376438		3.998369		
3	0.016914	1.565034		0.017401		
4	0.059076	0.656426		2.266794		
5	0.000311	0.000000		2.620721		

# LOST	Evts. mean
0	0.664107
1	0.000000
2	0.046439
3	0.001803
4	0.006258
5	1.833872

### 2.0.4 Cluster D

Job termination	# Tasks	mean	# Tasks	95% p.tile	# EVICT	Evts. mean	\
0	No termination	103.889987		120.00		41.421532	
1	EVICT	1.000000		1.00		1.000000	
2	FAIL	43.355682		250.00		6.111993	
3	FINISH	2.109260		2.00		0.268375	
4	KILL	89.647948		283.00		1.013114	
5	LOST	271.441748		2620.75		0.000000	

# FAIL	Evts. mean	# FINISH	Evts. mean	# KILL	Evts. mean	\
0	7.604808	18.179476		47.603502		
1	0.000000	0.000000		0.000000		
2	0.948602	0.531390		6.497784		
3	0.012614	1.723392		0.018567		
4	0.054374	0.283313		3.255675		
5	0.000000	0.000000		5.938069		



	# LOST Evts. mean
0	0.661826
1	0.000000
2	0.041077
3	0.005052
4	0.006664
5	1.647084

### 2.0.5 Cluster E

	Job termination	# Tasks mean	# Tasks 95% p.tile	# EVICT Evts. mean \
0	No termination	350.929407	596.0	7.204391
1	EVICT	1.000000	1.0	1.000000
2	FAIL	23.081125	25.0	0.246529
3	FINISH	7.776085	2.0	0.018677
4	KILL	88.790215	309.0	0.706293
5	LOST	5.374150	5.0	0.000000

	# FAIL Evts. mean	# FINISH Evts. mean	# KILL Evts. mean \
0	2.074423	0.126290	46.646065
1	0.000000	0.000000	0.000000
2	0.665546	0.716720	1.588119
3	0.029073	1.934488	0.020929
4	0.028618	0.461084	7.572301
5	0.000000	0.000000	3.234494

	# LOST Evts. mean
0	0.378274
1	0.000000
2	0.066467
3	0.064920
4	0.029122
5	1.813924

### 2.0.6 Cluster F

	Job termination	# Tasks mean	# Tasks 95% p.tile	# EVICT Evts. mean \
0	No termination	217.718640	379.4	4.304676
1	EVICT	1.000000	1.0	1.000000
2	FAIL	17.161251	8.0	0.621327
3	FINISH	2.940843	2.0	0.014704
4	KILL	103.888843	361.0	0.182630
5	LOST	3736.500000	18823.4	0.001491

	# FAIL Evts. mean	# FINISH Evts. mean	# KILL Evts. mean \
0	1.315021	4.971122	48.118465
1	0.000000	0.000000	0.000000
2	0.546356	0.426265	7.559244

3	0.051014	1.669860	0.162042
4	0.063914	0.416684	5.824311
5	0.000038	0.000000	6.298140

# LOST Evts. mean

0	0.464429
1	0.000000
2	0.034773
3	0.002623
4	0.014161
5	1.429604

### 2.0.7 Cluster G

Job termination	# Tasks mean	# Tasks 95% p.tile	# EVICT Evts. mean \
0 No termination	342.090034	599.10	14.184405
1 EVICT	1.000000	1.00	1.000000
2 FAIL	51.834803	250.00	0.555532
3 FINISH	8.519166	36.00	0.001733
4 KILL	37.054914	100.00	5.687172
5 LOST	190.500000	358.35	0.000000

# FAIL Evts. mean # FINISH Evts. mean # KILL Evts. mean \

0	0.626186	23.836017	46.002917
1	0.000000	0.000000	0.000000
2	3.334848	0.607560	20.351992
3	0.629809	1.759677	0.005452
4	0.064640	0.080370	19.166260
5	0.000000	0.000000	1.994751

# LOST Evts. mean

0	0.735801
1	0.000000
2	0.176242
3	0.004575
4	0.059132
5	1.994751

### 2.0.8 Cluster H

Job termination	# Tasks mean	# Tasks 95% p.tile	# EVICT Evts. mean \
0 No termination	321.133053	546.9	3.470078
1 EVICT	1.000000	1.0	1.000000
2 FAIL	20.504293	1.0	0.114090
3 FINISH	4.278193	14.0	0.005406
4 KILL	11.022705	3.0	0.235500
5 LOST	3.400000	10.6	0.000000

	# FAIL Evt. mean	# FINISH Evt. mean	# KILL Evt. mean	\
0	0.907801	3.316902	44.535824	
1	0.000000	0.000000	0.000000	
2	2.300036	0.980635	12.833466	
3	0.152814	1.778038	0.013567	
4	0.102899	0.287701	11.336956	
5	0.000000	0.000000	0.235294	

	# LOST Evt. mean
0	0.315120
1	0.000000
2	0.046833
3	0.012663
4	0.031148
5	1.705882

[ ]: