Project
Design of Experiments

➢ Instructions:

Your team has created a new mobile application, and you are tasked with using Design of Experiments to create pairwise combination test cases based upon the following requirements. Research and identify a tool that supports DOE and utilize the tool to develop test cases for the given specifications. Mobile Application Testing Specifications:

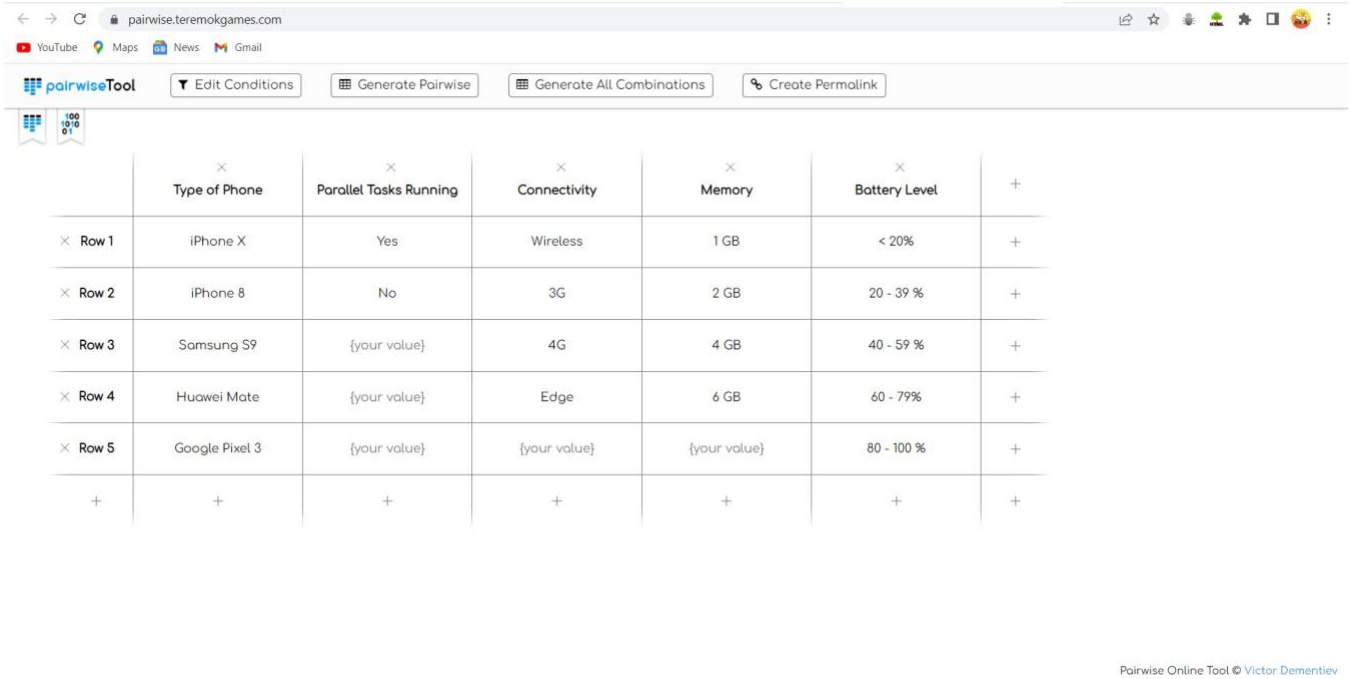
Type of Phone	Parallel Tasks Running	Connectivity	Memory	Battery Level
iPhone X	Yes	Wireless	1 GB	< 20%
iPhone 8	No	3G	2 GB	20 -39%
Samsung S9		4G	4 GB	40 - 59%
Huawei Mate		Edge	6 GB	60 - 79%
Google Pixel 3				80 - 100%

➢ DOE Rubric:

1) Description of DOE Tool:

- The tool that is used to generate the Design of experiments is 'pairwiseTool'.
- pairwiseTool is an online available tool that gives the option of generating full factorial and pairwise (2-way) design of experiments.
- We can add parameters by clicking on the '+' sign which is used to add the column.
- To add parameter values, we can click the '+' button on rows.
- The output is downloaded in the form of an **Excel file only** after entering all the parameters and their values and selecting the appropriate option (Full factorial or 2-way design of experiments)

- Screenshot:



- Link:

https://pairwise.teremokgames.com/

2) Number of Test cases generated by the DOE tool:

- Full factorial Design of experiments:
- **800** test cases

- Design of Experiments pairwise combinations:
- **25** test cases

3) Demonstration of test cases generated by DOE tool:

- **Full factorial design: [800 test-cases]**

- Screenshot 1:

A800 | fx | 799

	A	B	C	D	E	F	G	H	I	J	K
1		**Type of Phone**	**Parallel Tasks Running**	**Connectivity**	**Memory**	**Battery Level**					
5	**4**	iPhone X	Yes	Wireless	1 GB	60 - 79%					
6	**5**	iPhone X	Yes	Wireless	1 GB	80 - 100 %					
7	**6**	iPhone X	Yes	Wireless	2 GB	< 20%					
8	**7**	iPhone X	Yes	Wireless	2 GB	20 - 39 %					
9	**8**	iPhone X	Yes	Wireless	2 GB	40 - 59 %					
10	**9**	iPhone X	Yes	Wireless	2 GB	60 - 79%					
11	**10**	iPhone X	Yes	Wireless	2 GB	80 - 100 %					
12	**11**	iPhone X	Yes	Wireless	4 GB	< 20%					
13	**12**	iPhone X	Yes	Wireless	4 GB	20 - 39 %					
14	**13**	iPhone X	Yes	Wireless	4 GB	40 - 59 %					
15	**14**	iPhone X	Yes	Wireless	4 GB	60 - 79%					
16	**15**	iPhone X	Yes	Wireless	4 GB	80 - 100 %					
17	**16**	iPhone X	Yes	Wireless	6 GB	< 20%					
18	**17**	iPhone X	Yes	Wireless	6 GB	20 - 39 %					
19	**18**	iPhone X	Yes	Wireless	6 GB	40 - 59 %					
20	**19**	iPhone X	Yes	Wireless	6 GB	60 - 79%					
21	**20**	iPhone X	Yes	Wireless	6 GB	80 - 100 %					
22	**21**	iPhone X	Yes	3G	1 GB	< 20%					
23	**22**	iPhone X	Yes	3G	1 GB	20 - 39 %					
24	**23**	iPhone X	Yes	3G	1 GB	40 - 59 %					
25	**24**	iPhone X	Yes	3G	1 GB	60 - 79%					
26	**25**	iPhone X	Yes	3G	1 GB	80 - 100 %					
27	**26**	iPhone X	Yes	3G	2 GB	< 20%					
28	**27**	iPhone X	Yes	3G	2 GB	20 - 39 %					
29	**28**	iPhone X	Yes	3G	2 GB	40 - 59 %					
30	**29**	iPhone X	Yes	3G	2 GB	60 - 79%					
31	**30**	iPhone X	Yes	3G	2 GB	80 - 100 %					
32	**31**	iPhone X	Yes	3G	4 GB	< 20%					
33	**32**	iPhone X	Yes	3G	4 GB	20 - 39 %					

- Screenshot 2:

A800 | fx | 799

	A	B	C	D	E	F	G	H	I	J	K	L
1		Type of Phone	Parallel Tasks Running	Connectivity	Memory	Battery Level						
776	775	Google Pixel 3	No	4G	4 GB	80 - 100 %						
777	776	Google Pixel 3	No	4G	6 GB	< 20%						
778	777	Google Pixel 3	No	4G	6 GB	20 - 39 %						
779	778	Google Pixel 3	No	4G	6 GB	40 - 59 %						
780	779	Google Pixel 3	No	4G	6 GB	60 - 79%						
781	780	Google Pixel 3	No	4G	6 GB	80 - 100 %						
782	781	Google Pixel 3	No	Edge	1 GB	< 20%						
783	782	Google Pixel 3	No	Edge	1 GB	20 - 39 %						
784	783	Google Pixel 3	No	Edge	1 GB	40 - 59 %						
785	784	Google Pixel 3	No	Edge	1 GB	60 - 79%						
786	785	Google Pixel 3	No	Edge	1 GB	80 - 100 %						
787	786	Google Pixel 3	No	Edge	2 GB	< 20%						
788	787	Google Pixel 3	No	Edge	2 GB	20 - 39 %						
789	788	Google Pixel 3	No	Edge	2 GB	40 - 59 %						
790	789	Google Pixel 3	No	Edge	2 GB	60 - 79%						
791	790	Google Pixel 3	No	Edge	2 GB	80 - 100 %						
792	791	Google Pixel 3	No	Edge	4 GB	< 20%						
793	792	Google Pixel 3	No	Edge	4 GB	20 - 39 %						
794	793	Google Pixel 3	No	Edge	4 GB	40 - 59 %						
795	794	Google Pixel 3	No	Edge	4 GB	60 - 79%						
796	795	Google Pixel 3	No	Edge	4 GB	80 - 100 %						
797	796	Google Pixel 3	No	Edge	6 GB	< 20%						
798	797	Google Pixel 3	No	Edge	6 GB	20 - 39 %						
799	798	Google Pixel 3	No	Edge	6 GB	40 - 59 %						
800	799	Google Pixel 3	No	Edge	6 GB	60 - 79%						
801	800	Google Pixel 3	No	Edge	6 GB	80 - 100 %						
802												

➢ Pairwise combinations DOE: [25 test-cases]

A25 | fx | 24

	A	B	C	D	E	F	G	H	I	J	K
1		**Type of Phone**	**Parallel Tasks Running**	**Connectivity**	**Memory**	**Battery Level**					
2	**1**	iPhone X	Yes	Wireless	1 GB	< 20%					
3	**2**	iPhone X	No	3G	2 GB	20 - 39 %					
4	**3**	iPhone X	Yes	4G	4 GB	40 - 59 %					
5	**4**	iPhone X	No	Edge	6 GB	60 - 79%					
6	**5**	iPhone X	Yes	Wireless	1 GB	80 - 100 %					
7	**6**	iPhone 8	No	4G	6 GB	80 - 100 %					
8	**7**	iPhone 8	Yes	Edge	1 GB	< 20%					
9	**8**	iPhone 8	No	Wireless	1 GB	20 - 39 %					
10	**9**	iPhone 8	Yes	Wireless	2 GB	40 - 59 %					
11	**10**	iPhone 8	Yes	3G	4 GB	60 - 79%					
12	**11**	Samsung S9	Yes	Wireless	2 GB	60 - 79%					
13	**12**	Samsung S9	No	Wireless	4 GB	80 - 100 %					
14	**13**	Samsung S9	Yes	3G	6 GB	< 20%					
15	**14**	Samsung S9	Yes	4G	1 GB	20 - 39 %					
16	**15**	Samsung S9	No	Edge	1 GB	40 - 59 %					
17	**16**	Huawei Mate	No	3G	1 GB	40 - 59 %					
18	**17**	Huawei Mate	Yes	4G	1 GB	60 - 79%					
19	**18**	Huawei Mate	Yes	Edge	2 GB	80 - 100 %					
20	**19**	Huawei Mate	No	Wireless	4 GB	< 20%					
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22	**21**	Google Pixel 3	Yes	Edge	4 GB	20 - 39 %					
23	**22**	Google Pixel 3	Yes	Wireless	6 GB	40 - 59 %					
24	**23**	Google Pixel 3	No	Wireless	1 GB	60 - 79%					
25	**24**	Google Pixel 3	Yes	3G	1 GB	80 - 100 %					
26	**25**	Google Pixel 3	No	4G	2 GB	< 20%					
27											
28											

4) Assessment of DOE tool in own words:

- The DOE tool generated all the test cases possible in a full-factorial design (800 cases).
- In terms of the pairwise design of experiments, the tool generated all 25 combinations which include every possible pair of every two parameter values:

i) Type of phone – parallel tasks running
ii) Type of phone – connectivity
iii) Type of phone – memory
iv) Type of phone – battery level
v) Parallel tasks running – connectivity
vi) Parallel tasks running - memory
vii) Parallel tasks running – battery level
viii) Connectivity – memory
ix) Connectivity – battery level
x) Memory – battery level

- Moreover, while creating pairwise combinations, it also shows the message that how many test cases are covered in generated test cases for pairwise. In our case '800 variants covered in 25 use cases' in pairwise design of experiments.