

# CSE565 Design of Experiments

Yu Chang

ychan175@asu.edu

## I. Software Specification

Software Rendering Performance Test: To evaluate the impact of different rendering settings on software rendering performance.

1. Rendering Resolution: 5 levels: 720p, 1080p, 1440p, 4K, 8K
2. Anti-aliasing Mode: 5 levels: None, FXAA, MSAA x2, MSAA x4, MSAA x8
3. Graphics Effects Level: 5 levels: Low, Medium, High, Very High, Ultra
4. Texture Quality: 3 levels: Low, Medium, High
5. Shadow Effects: 3 levels: None, Low, High

## II. Tool: Python library: allpairspy 2.5.1

<https://github.com/thombashi/allpairspy>

```
pairwise.py > ...
1  from allpairspy import AllPairs
2
3  parameters = [
4      ["720p", "1080p", "1440p", "4K", "8K"],
5      ["None", "FXAA", "MSAA x2", "MSAA x4", "MSAA x8"],
6      ["Low", "Medium", "High", "Very High", "Ultra"],
7      ["Low", "Medium", "High"],
8      ["None", "Low", "High"],
9  ]
10
11  print("PAIRWISE TEST CASE:")
12  for i, pairs in enumerate(AllPairs(parameters)):
13      print("{:2d}: {}".format(i, pairs))
```

### III. Test cases

```
PAIRWISE TEST CASE:
0: ['720p', 'None', 'Low', 'Low', 'None']
1: ['1080p', 'FXAA', 'Medium', 'Medium', 'None']
2: ['1440p', 'MSAA x2', 'High', 'High', 'None']
3: ['4K', 'MSAA x4', 'Very High', 'High', 'Low']
4: ['8K', 'MSAA x8', 'Ultra', 'Medium', 'Low']
5: ['8K', 'MSAA x4', 'High', 'Low', 'High']
6: ['4K', 'MSAA x2', 'Medium', 'Low', 'Low']
7: ['1440p', 'FXAA', 'Low', 'Medium', 'High']
8: ['1080p', 'None', 'Ultra', 'High', 'High']
9: ['720p', 'MSAA x8', 'Very High', 'High', 'High']
10: ['4K', 'FXAA', 'High', 'Medium', 'Low']
11: ['720p', 'MSAA x4', 'Ultra', 'Medium', 'None']
12: ['1080p', 'MSAA x2', 'Very High', 'Medium', 'High']
13: ['1440p', 'MSAA x8', 'Medium', 'Low', 'High']
14: ['8K', 'None', 'Very High', 'Medium', 'None']
15: ['1080p', 'MSAA x8', 'Low', 'Low', 'Low']
16: ['4K', 'None', 'Low', 'High', 'High']
17: ['8K', 'FXAA', 'Very High', 'High', 'High']
18: ['1440p', 'None', 'Very High', 'Low', 'Low']
19: ['720p', 'FXAA', 'Medium', 'High', 'Low']
20: ['8K', 'MSAA x2', 'Low', 'High', 'High']
21: ['4K', 'MSAA x8', 'Ultra', 'Low', 'None']
22: ['720p', 'MSAA x2', 'Ultra', 'High', 'High']
23: ['1440p', 'MSAA x4', 'Low', 'High', 'High']
24: ['1080p', 'MSAA x4', 'Medium', 'High', 'High']
25: ['1080p', 'FXAA', 'Ultra', 'Low', 'High']
26: ['1080p', 'None', 'High', 'High', 'High']
27: ['1440p', 'None', 'Ultra', 'High', 'High']
28: ['720p', 'None', 'Medium', 'High', 'High']
29: ['720p', 'MSAA x8', 'High', 'High', 'High']
30: ['8K', 'None', 'Medium', 'High', 'High']
```

### IV. References

D. Ongari, "Awesome Design of Experiments," GitHub repository, [Online]. Available:

<https://github.com/danieleongari/awesome-design-of-experiments>. [Accessed: Nov. 2, 2024].

C. Licumu, "pyDOE2," GitHub repository, [Online]. Available: <https://github.com/clicumu/pyDOE2>. [Accessed: Nov. 2, 2024].

"AutoOED Documentation," [Online]. Available: <https://autooed.readthedocs.io/en/latest/>. [Accessed: Nov. 2, 2024].

T. Bash, "allpairsy," GitHub repository, [Online]. Available: <https://github.com/thombashi/allpairsy>. [Accessed: Nov. 2, 2024].