123. Approximation Algorithm Vertex Cover, Set Cover

Code:

```
def set_cover_approx(sets, universe):
    covered = set()
    cover = []

    while covered != universe:
        # Choose the set that covers the most uncovered elements
        best_set = max(sets, key=lambda s: len(s - covered))
        cover.append(best_set)
        covered |= best_set
        sets.remove(best_set)

    return cover

universe = set(range(1, 11))
sets = [
    {1, 2, 3, 8},
    {3, 4, 5},
    {4, 5, 6, 7},
    {5, 6, 7, 8},
    {8, 9, 10}
]

print(f"Approximate Set Cover: {set_cover_approx(sets, universe)}")
```

output:

```
PS C:\Users\karth>
PS C:\Users\karth> & C:/Users/karth/AppData/Local/Programs/Python/Python312/python.exe c:/Users/karth/OneDrive/Documents/OriginLab/problem.py
Approximate Set Cover: [{8, 1, 2, 3}, {4, 5, 6, 7}, {8, 9, 10}]
PS C:\Users\karth>
```

Time complexity:f(n)=o(n*n)