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Course:	Advance Algorithm Laboratory
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Experiment No.:	01-C

AIM: Perform Amortized Analysis of Multipop / Dynamic Tables / Binary Counter using Aggregate, Accounting and Potential method. (Amortized Analysis)

1C) Amortized Analysis (Potential method)

CODE:

```
def potential(n):
    size = 1
    total = 0
    dcost = 0
    icost = 0
    bank = 0
    phi = 0
    ci = 0
    phi_prev = 0

    print("Elements\tDoubling Copying Cost\tInsertion Cost\tTotal
Cost\t\tBank\t\tSize\t\tPhi\t\tCi")
    for i in range(1, n + 1):
        icost = 1
        if i > size:
            size *= 2
            dcost = i - 1
        total = icost + dcost
        phi = 2 * i - size
        ci = total + phi - phi_prev
        bank += (3 - total)
        print(i, "\t\t\t\t", dcost, "\t\t", icost, "\t", total, "\t\t\t",
bank, "\t\t", size, "\t\t", phi, "\t\t", ci)
        icost = 0
        dcost = 0
        phi_prev = phi

potential(10)
```

OUTPUT:

```
PS C:\Users\Jadhav\Documents\BTech\Docs\6th Sem\AA\Code> & C:/msys64/mingw64/bin/python.exe "c:/Users/Jadhav/Documents/BTech/Docs/6th Sem/AA/Code/Potenti
al.py"
Elements        Doubling Copying Cost   Insertion Cost  Total Cost              Bank            Size            Phi             Ci
1                               0               1       1                       2               1               1               2
2                               1               1       2                       3               2               2               3
3                               2               1       3                       3               4               2               3
4                               0               1       1                       5               4               4               3
5                               4               1       5                       3               8               2               3
6                               0               1       1                       5               8               4               3
7                               0               1       1                       7               8               6               3
8                               0               1       1                       9               8               8               3
9                               8               1       9                       3               16              2               3
10                              0               1       1                       5               16              4               3
PS C:\Users\Jadhav\Documents\BTech\Docs\6th Sem\AA\Code>
```

CONCLUSION: Hence we studied amortized analysis-Potential method.