Sheet1

| | bb.bba | bb.gbest | bb.gbestgc | bb.lbest | bb.lbestgc | bb.spso | bb.vn | bb.vngc | bba.gbestbba.gbestgc | | bba.lbest |
|----------------|--------|----------|------------|----------|------------|---------|-------|---------|----------------------|----|-----------|
| ackley | 1 | 0 | 0 | 1 | 1 | -1 | 1 | 1 | -1 | -1 | 1 |
| alpine | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | -1 | -1 | 1 |
| eggholder | 0 | -1 | -1 | -1 | -1 | -1 | 1 | 1 | 0 | 0 | 0 |
| elliptic | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | -1 | -1 | 1 |
| goldsteinprice | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | -1 | 1 | -1 |
| griewank | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | -1 | -1 | 1 |
| levy | 1 | -1 | -1 | 1 | 1 | 0 | 0 | 1 | -1 | -1 | 1 |
| michalewicz | 1 | -1 | -1 | 1 | 1 | -1 | 1 | 1 | -1 | -1 | -1 |
| quadric | 1 | -1 | -1 | 0 | 0 | -1 | -1 | -1 | -1 | -1 | -1 |
| quartic | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | -1 | -1 | 1 |
| rastrigin | 1 | -1 | 0 | 1 | 1 | -1 | 1 | 1 | -1 | -1 | 0 |
| rosenbrock | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| salomon | 1 | -1 | -1 | 1 | 1 | -1 | 0 | 0 | -1 | -1 | 1 |
| schwefel1_2 | 0 | -1 | -1 | 0 | 0 | -1 | -1 | -1 | -1 | -1 | 0 |
| schwefel2_22 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | -1 | 0 | 1 |
| schwefel2_26 | 0 | 0 | 0 | 0 | 0 | -1 | 1 | 1 | 0 | 0 | 0 |
| sixhump | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| spherical | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | -1 | -1 | 1 |
| step | 1 | 0 | 0 | 1 | 1 | -1 | 1 | 1 | -1 | 0 | 1 |
| zakharov | 1 | -1 | -1 | 1 | 1 | -1 | 1 | 1 | -1 | -1 | 0 |
| -1 | 0 | 8 | 7 | 1 | 1 | 10 | 2 | 2 | 16 | 13 | 3 |
| 0 | 3 | 9 | 9 | 4 | 4 | 6 | 2 | 1 | 3 | 5 | 6 |
| 1 | 17 | 3 | 4 | 15 | 15 | 4 | 16 | 17 | 1 | 2 | 11 |

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| bba.lbestgc | bba.spso | bba.vn | bba.vngc | est.gbest | gbest.lbest | gbest.lbestg | gbest.sps | gbest.vr | best.vng | gbestgc.lbest g | bestgc.lbestg | gbestgc.sps | gbestgc.vr |
|-------------|----------|--------|----------|-----------|-------------|--------------|-----------|----------|----------|-----------------|---------------|-------------|------------|
| 1 | -1 | 1 | 1 | 0 | 1 | 1 | -1 | 1 | 1 | 1 | 1 | -1 | 1 |
| 1 | -1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | -1 | 1 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | 1 | 1 | 0 | 0 | 0 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | -1 | -1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | -1 | 0 | -1 | -1 |
| 1 | -1 | -1 | -1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 |
| 1 | -1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| -1 | -1 | -1 | -1 | 1 | 1 | 1 | -1 | 1 | 1 | 1 | 1 | -1 | 1 |
| -1 | -1 | -1 | -1 | 0 | 1 | 1 | -1 | 1 | 1 | 1 | 1 | -1 | 1 |
| 1 | -1 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 |
| 0 | -1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | -1 | 1 |
| 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | -1 | 0 | 1 | 1 | 1 | 0 |
| 1 | -1 | -1 | -1 | 0 | 1 | 1 | -1 | 1 | 1 | 1 | 1 | -1 | 1 |
| -1 | -1 | -1 | -1 | 0 | 1 | 1 | -1 | 1 | 1 | 1 | 1 | -1 | 1 |
| 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 |
| 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | -1 | 1 |
| 0 | -1 | 0 | 0 | 0 | 0 | 0 | -1 | 0 | 0 | 0 | 0 | -1 | 0 |
| 1 | -1 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 |
| 1 | -1 | 1 | 1 | 0 | 1 | 1 | -1 | 1 | 1 | 1 | 1 | -1 | 1 |
| 0 | -1 | -1 | -1 | 0 | 1 | 1 | -1 | 1 | 1 | 1 | 1 | -1 | 1 |
| 3 | 15 | 7 | 6 | 0 | 0 | 0 | 9 | 1 | 0 | 1 | 0 | 12 | 1 |
| 5 | 3 | 3 | 3 | 14 | 3 | 3 | 7 | 2 | 2 | 3 | 4 | 5 | 2 |
| 12 | 2 | 10 | 11 | 6 | 17 | 17 | 4 | 17 | 18 | 16 | 16 | 3 | 17 |

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| bestgc.vng | lbest.lbestgc | lbest.spso | lbest.vn | lbest.vngc | lbestgc.spso | lbestgc.vn | lbestgc.vngc | spso.vn | spso.vngc | vn.vngc |
|------------|---------------|------------|----------|------------|--------------|------------|--------------|---------|-----------|---------|
| 1 | 0 | -1 | -1 | -1 | -1 | -1 | -1 | 1 | 1 | 0 |
| 1 | 0 | -1 | 0 | 0 | -1 | 0 | 0 | 1 | 1 | 0 |
| 1 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 0 |
| 1 | 1 | 0 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | 0 |
| 0 | 1 | -1 | 0 | 1 | -1 | -1 | 0 | 1 | 1 | 1 |
| 1 | 0 | -1 | -1 | -1 | -1 | -1 | -1 | 1 | 1 | 0 |
| 1 | 1 | -1 | -1 | -1 | -1 | -1 | -1 | 0 | 1 | 0 |
| 1 | 0 | -1 | 0 | 0 | -1 | 0 | 1 | 1 | 1 | 0 |
| 1 | 0 | -1 | -1 | -1 | -1 | -1 | -1 | 1 | 1 | 0 |
| 1 | 1 | -1 | -1 | -1 | -1 | -1 | -1 | 1 | 1 | 1 |
| 1 | 0 | -1 | 1 | 1 | -1 | 1 | 1 | 1 | 1 | 0 |
| 0 | 0 | 1 | -1 | -1 | 1 | -1 | -1 | -1 | -1 | 1 |
| 1 | 0 | -1 | -1 | -1 | -1 | -1 | -1 | 1 | 1 | 0 |
| 1 | 0 | -1 | -1 | -1 | -1 | -1 | -1 | 1 | 1 | 0 |
| 1 | 1 | -1 | -1 | -1 | -1 | -1 | -1 | 1 | 1 | 0 |
| 1 | 0 | 0 | 1 | 1 | -1 | 1 | 1 | 1 | 1 | 0 |
| 0 | 0 | -1 | 0 | 0 | -1 | 0 | 0 | 1 | 1 | 0 |
| 1 | 0 | -1 | -1 | -1 | -1 | -1 | -1 | 1 | 1 | 0 |
| 1 | 0 | -1 | -1 | -1 | -1 | -1 | -1 | 1 | 1 | 0 |
| 1 | 0 | -1 | -1 | -1 | -1 | -1 | -1 | 1 | 1 | 1 |
| 0 | 0 | 16 | 13 | 13 | 18 | 14 | 13 | 2 | 2 | 0 |
| 3 | 15 | 3 | 4 | 3 | 1 | 3 | 3 | 1 | 0 | 16 |
| 17 | 5 | 1 | 3 | 4 | 1 | 3 | 4 | 17 | 18 | 4 |