Black-box optimization problem

Find the minimization value of the given black-box function. Students can use any optimization method to solve this problem.

1   1-D black-box function

The design space for 1-D block-fox function is given in Table 1.

Table 1: Design space for problem 1

Function no.	Search domain
1	$-2.7 \leq x \leq 7.5$
2	$0 \leq x \leq 7.5$
3	$-2.7 \leq x \leq 7.5$
4	$-2.7 \leq x \leq 7.5$
5	$0 \leq x \leq 7.5$
6	$-2.7 \leq x \leq 7.5$
7	$-2.7 \leq x \leq 7.5$
8	$0 \leq x \leq 8$
9	$-2.7 \leq x \leq 7.5$
10	$0 \leq x \leq 8$
11	$0 \leq x \leq 8$
M1	$0 \leq x \leq 1.2$
M2	$-0.5 \leq x \leq 1.2$
M3	$-1 \leq x \leq -1$

2 2-D black-box function

The design space for 2-D block-fox function is given in Table 2.

Table 2: Design space for problem 2

Function no.	Search domain
2-1	$-5.12 \leq x_1, x_2 \leq 5.12$
2-2	$-5 \leq x_1, x_2 \leq 5$
2-3	$-200 \leq x_1, x_2 \leq 200$
2-4	$-20 \leq x_1, x_2 \leq 20$
2-5	$-4.5 \leq x_1, x_2 \leq 4.5$
2-6	$-2 \leq x_1, x_2 \leq 2$
2-7	$-10 \leq x_1, x_2 \leq 10$
2-8	$-15 \leq x_1 \leq 5, -3 \leq x_2 \leq 3$
2-9	$-10 \leq x_1, x_2 \leq 10$
2-10	$-10 \leq x_1, x_2 \leq 10$
2-11	$-5 \leq x_1, x_2 \leq 5$
M2-1	$-5 \leq x_1, x_2 \leq 5$
M2-2	$-1.5 \leq x_1 \leq 4, -3 \leq x_2 \leq 4$
M2-3	$-5 \leq x_1, x_2 \leq 5$