Problem of the Week – 4

Decidability and Recognizability

Let $L$ be the following language.

$$\{(M, w) : M \text{ is a DTM and does not enter all of its non-halting states during the computation on } w\}.$$ 

Determine which of the three categories does $L$ lie in: (A) decidable; (B) undecidable but recognizable; (c) unrecognizable.