Tutorial # 02
CE 515: Genetic Algorithms

Q. No. 1   Genetic algorithms will be used for obtaining the optimal solution of the
            following problem.
                    Maximize $f(x) = |\sin(\pi x)|$
                    Subject to $0 \leq x \leq 2$
            What arbitrary precision one can be achieved if binary string of length six is
            used?

Q. No. 2   Genetic algorithms will be used for obtaining the optimal solution of the
            following problem.

                    Maximize $f(x) = x^3 + 10x - 2\exp(x)$
                    Subject to $0.5 \leq x \leq 3.5$

            (a) What arbitrary precision can be achieved if binary string of length six is
                used?

            (b) What will be the length of the binary string in order to achieve an arbitrary
                precision of 0.000001.

Q. No. 3   GA will be applied to solve the following problem,
                    $Minimize\ f(x) = [\,(x_1 - 1.5)^2 + (x_2 - 4)^2\,]$
                    $Subject\ to$
                            $4.5x_1 + x_2^2 - 18 \leq 0$
                            $2x_1 + x_2 - 1 \geq 0$
                            $0 \leq x_1, x_2 \leq 4$
            Obtain the fitness value of the following strings.
            0110110111,   1010111100,   0010000110,   1101001101,   1100111001,
            0111110101
            First five bits represent the variable x_1 and the second five bits represent the
            variable x_2.