**Question-1:**

From the visualization of functions 3D plots we can say

Quadratic fucntion is Convex

Ridge Regularized Logistic function is also convex.

Himmenblaus function is not a convex function

Rosen brock's Fucntion is also not a convex function.

**Question 2:**

Logistic and quadratic functions are converging to the global minimum points with all the step sizes

For all the initializations.

AS himmelblaus function is not a convex function so gradient descent with low step sizes converged to a local minimum value. But for high stepsize it will not converge to the mocal minimum point.

Rosenbrock is also not convex function and gradient descent with large step size is not converging to the local minima point.

***Question 3*** :

Back tracking is taking less steps to converge but all the initializations are not converging to the same minimum point.

Rosenbrock function also getting some optimum solution with back tracking.

**Question4:**

This method also not able to find the optimum good solution for Rosenbrock and himmenblus function. For quadratic and logistic functions it is taking more time to converge but converging to the same point.