

CSC311 – Introduction to Machine Learning
Josh Alexander 1005434558

Assignment 1 – Printed Output

(414, 8)

Question 1

Question 1(a):

[1. 2. 3. 4. 5. 6. 7. 8. 9. 10.]

Question 1(b):

[2012.917 2012.917 2013.583 2013.5 2012.833 2012.667 2012.667 2013.417
2013.5 2013.417]

Question 1(d):

(414, 7)

Question 1(f):

(70, 7)

(344, 7)

Question 1(g):

(273, 7)

(71, 7)

Question 1(h):

[[32. 84.87882 10. 24.98298 121.54024]
[5. 390.5684 5. 24.97937 121.54245]]
[37.9 43.1]
[[19.5 306.5947 9. 24.98034 121.53951]
[34.5 623.4731 7. 24.97933 121.53642]]
[42.2 40.3]
[[13.3 561.9845 5. 24.98746 121.54391]
[13.3 561.9845 5. 24.98746 121.54391]]
[47.3 54.8]

Question 1(i):

[2013.14897101 17.71256039 1083.88568891 4.0942029 24.96903007
121.53336109 37.98019324]
[2.81626494e-01 1.13787172e+01 1.26058439e+03 2.94200221e+00
1.23951994e-02 1.53286366e-02 1.35900448e+01]
[17.7018315 1029.6309178 4.05494505 24.96959267 121.53340674]
[1.15249195e+01 1.21117367e+03 2.84275045e+00 1.14181823e-02
1.50324998e-02]

Question 1(l):

[[1.4 2.5 3.]
[9.1 3.4 2.3]]
[10.5 5.9 5.3]
[[-9.1 -3.4 -2.3]
[-1.4 -2.5 -3.]]

Question 1(m):

[1.08760172e-15 -1.28509332e-16 1.01668775e-16 -4.21720046e-13
-4.74405822e-13]
[[1.24063066 -0.78003025 2.09130384 1.17245685 0.45456578]
[-1.10211889 -0.52763904 0.33244386 0.85629444 0.60158059]]

Question 1(n):

Non-vectorized time: 0.0008151531219482422
Vectorized time: 0.0005407333374023438

Question 2

Question 2(a):

[4.93151815e+04 7.27783230e+03 3.49124023e+06 1.00237381e+04
4.68901518e+04 3.45191975e+04 4.67881241e+06 5.74125724e+02
2.02590444e+03 8.05369578e+04]
[16.4 289.3248 5. 24.98203 121.54348]
51.0

Question 2(b):

48.4

Question 2(c):

36.5

Question 2(d):

87.38781762803741

100.32602775193475

Question 2(e):

[1.272838827838828, 11.701318681318682, 16.87695563695564, 19.409021291208795, 21.884519413919417, 23.346581196581198, 25.732216490992, 27.047821371336997, 28.605928639261975, 29.401605494505496, 29.94845639209276, 30.117731227106226, 30.770804668704077, 30.868723368468263, 31.567217419617428, 32.055651971726185, 32.63201965854215, 33.10690408357075, 33.81628534900003, 34.676221016483524, 34.75835509539592, 35.00553711440075, 35.3355576905766, 34.677740003052506, 35.05135416849817, 34.88217997485749, 35.31929978343559, 35.34420710454512, 35.635448968391884, 36.066147008547006]
[48.451901408450695, 37.5631161971831, 35.367660406885754, 35.08202904929577, 35.43067323943662, 34.493298122065724, 35.30670594998562, 36.120761443661976, 36.21099113197704, 37.37119507042252, 37.30329239902223, 38.66444982394366, 39.89169305775481, 41.02963710836446, 41.719577464788735, 42.04795774647887, 41.89855792192602, 41.98609133194227, 41.62329288751902, 41.28323415492957, 41.4055522021015, 41.5083666045862, 40.820715940254, 39.636238018388106, 41.10632619718307, 41.26189692891072, 41.11700071485151, 41.350532839896495, 41.44435338547336, 41.838405477308285]

Question 2(f):

[1.5408058608058612, 11.496204212454211, 14.855592185592185, 18.83653502747253, 21.395587545787546, 22.768291615791608, 24.24111796366898, 25.91565533424908, 27.343693302582192, 27.598151282051276, 27.59082114854843, 28.00973188848189, 28.23701096733642, 28.686835613366227, 29.011143019943013, 29.14221490098443, 29.689953356908372, 30.23350749559083, 30.674050257222003, 30.857163415750914, 31.287499605458784, 31.782410316955765, 32.196260758774926, 32.76701547873422, 32.825923985347984, 32.895900063940005, 33.11401905364868, 33.47973263343799, 33.69317028393723, 34.03299660154661]
[46.54352112676056, 38.65519366197183, 35.11298122065726, 41.626417253521126, 38.02954366197182, 35.95572574334899, 34.9724561655648, 35.1063710387324, 34.63284211441489, 33.50182816901409, 34.47468862763357, 34.9104156885759, 34.28388782398533, 34.473753592986505, 34.84219999999999, 35.12469080105634, 36.08705102587845, 36.45852503912363, 37.06540029651593, 37.53928327464788, 38.415220529526366, 38.48047986264695, 38.172624936766155, 39.10015637226134, 38.814748732394364, 38.84031263021919, 39.576502830425625, 39.851073764012654, 40.449650315687244, 40.961081690140844]

Question 3

Question 3(a):

[42.25538722 -0.2532634]

Question 3(c):

Question 3(d):

[5.24237889e+01 -1.83379775e+00 3.99166404e-02]

Question 3(f):

105.2577478677121

119.12442531632422

Question 3(g):

[87.38781762803741, 91.64763199279945, 105.2577478677121, 105.8119685278515, 105.81646313160631, 105.81910380735593, 106.18850064636382, 106.24257055454738, 108.0022297595001, 108.02765189073024, 108.7434000832603]

[100.32602775193473, 104.5068245235788, 119.12442531632422, 120.96260833744128, 121.20277497564757, 121.49145951787592, 130.28137083284923, 125.40248141803386, 226.5111373100968, 265.42331177286036, 221.79973140528543]

Question 4

Question 4(e):

[-1.]

Question 4(g):

[42.23043921 -0.25227295]

Question 4(i):

[-5.76458975e+25 -1.45200979e+27]

Question 5

Question 5(e):

34.09516490299823