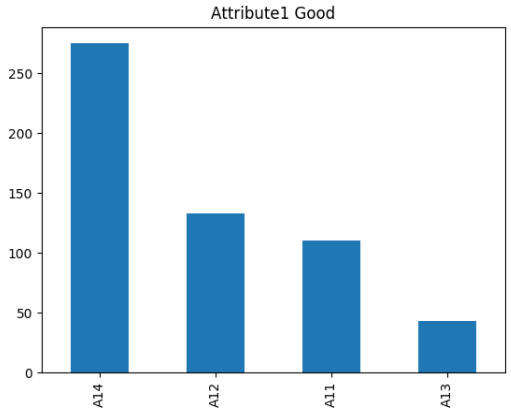
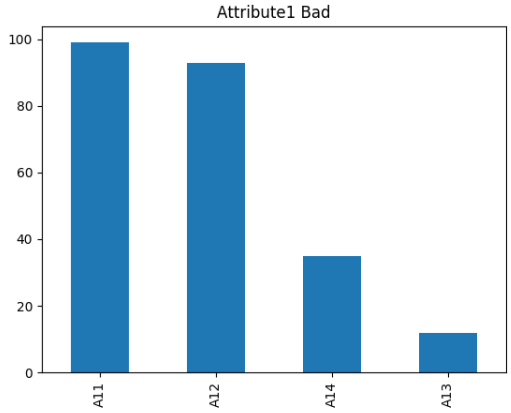
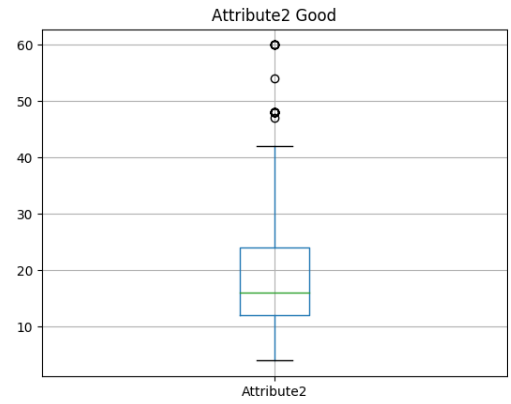
ΤΕΧΝΙΚΕΣ ΕΞΟΡΥΞΗΣ ΔΕΔΟΜΕΝΩΝ
ΕΡΓΑΣΙΑ 2η

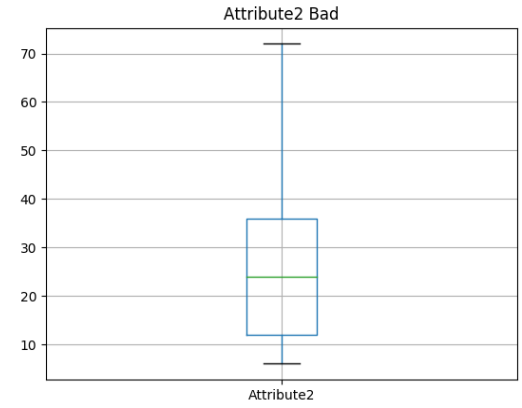
Συμμετέχοντες:
Βαγγέλης Τσιατούρας (1115201200185)
Νίκος Σοφράς (1115201200168)

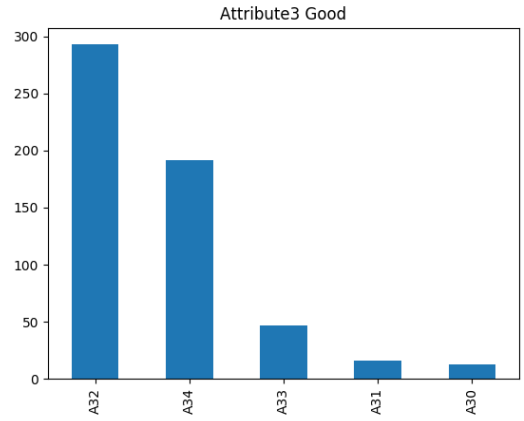
Οπτικοποίηση Δεδομένων










Attribute3 Good
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200
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100
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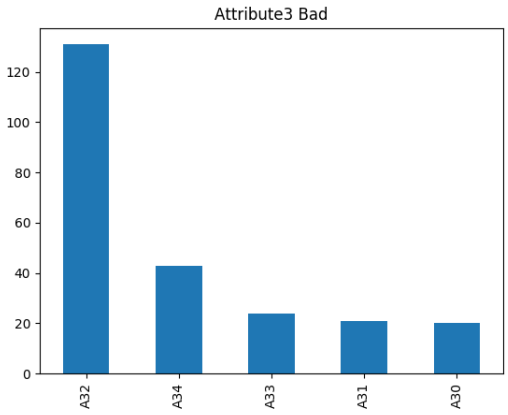
A32
A34
A33
A31
A30


Attribute3 Bad
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A31
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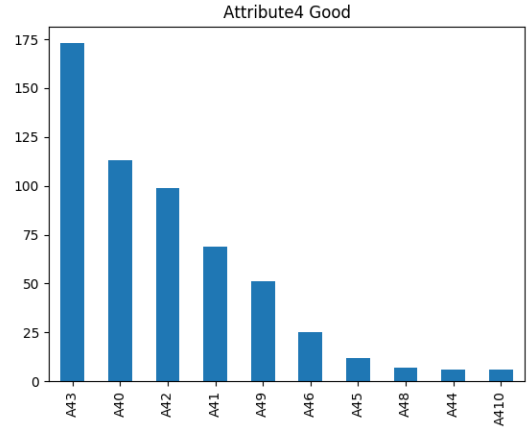
Attribute4 Good
175
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A42
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A49
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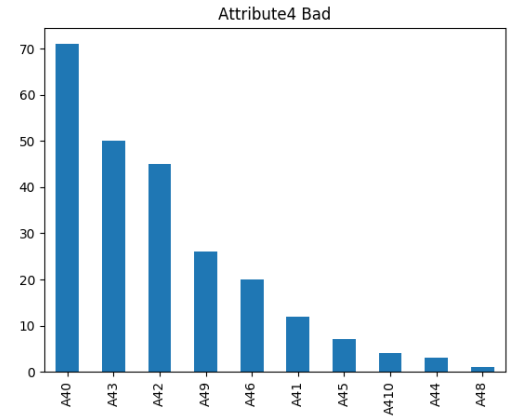
A45
A48
A44
A410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70
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A46
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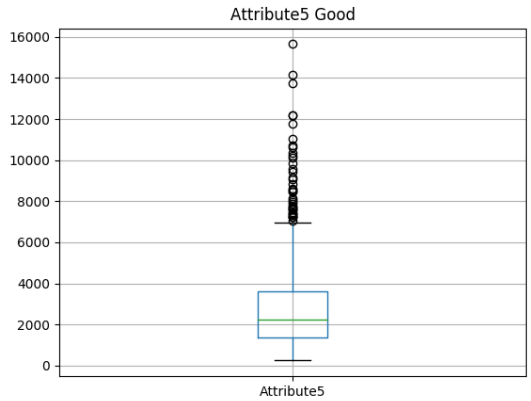
A44
A48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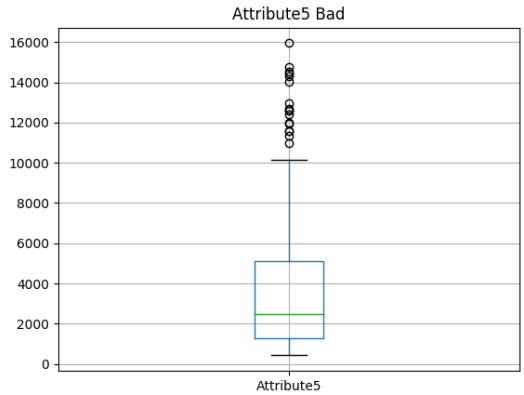
6000
4000
2000
0
Attribute5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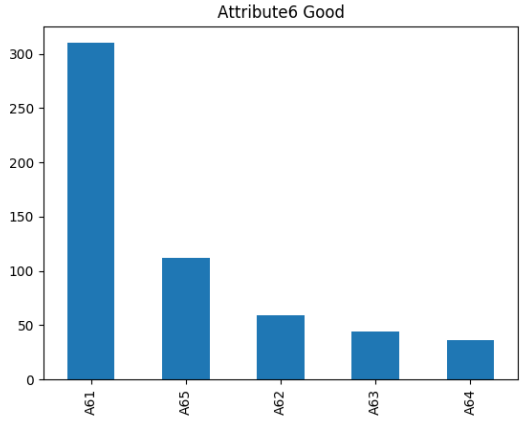
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150
100
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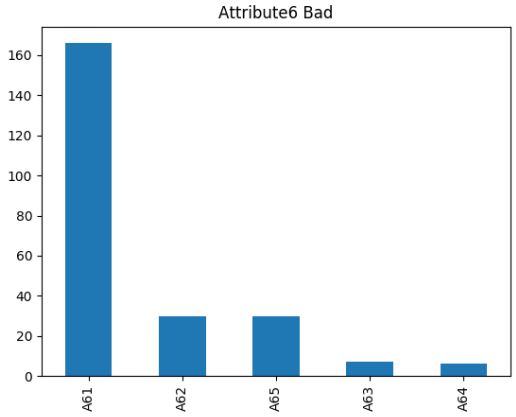
A61
A65
A62
A63
A64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160
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60
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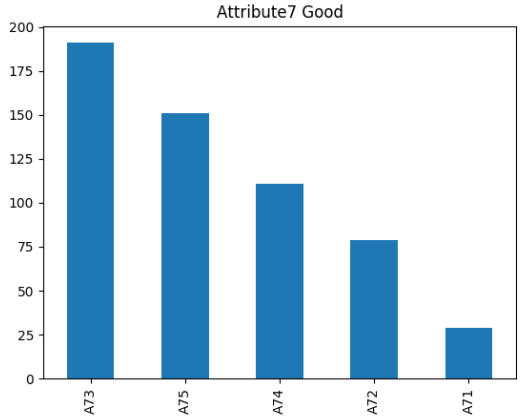
20
0
A61
A62
A65
A63
A64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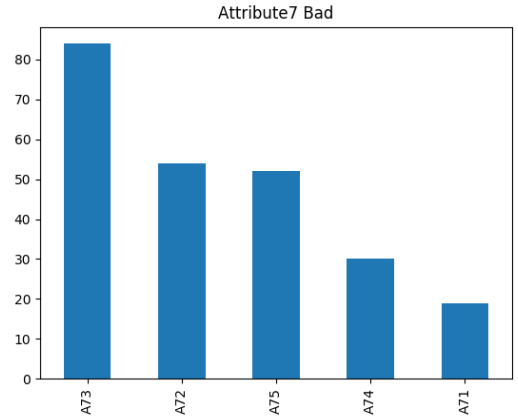
200
175
150
125
100
75
50
25
0
A73
A75
A74
A72
A71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0
A73
A72
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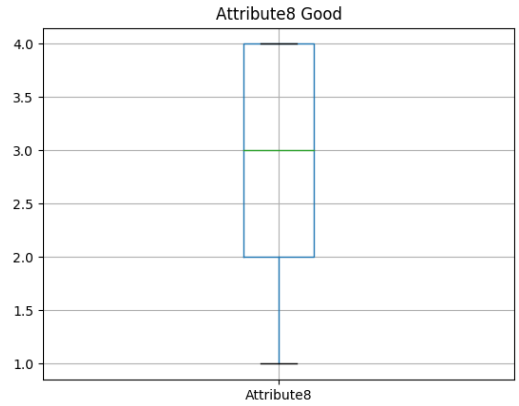
A71


Attribute8 Good
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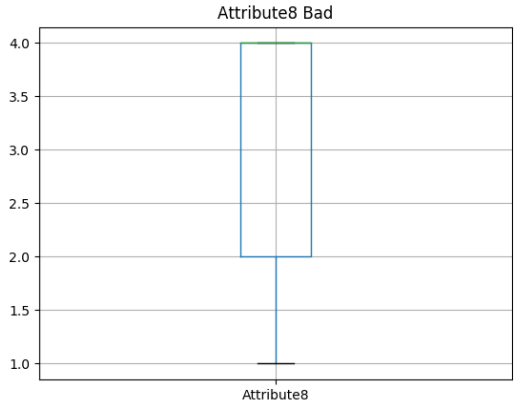
3.5
3.0
2.5
2.0
1.5
1.0
Attribute8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1.5
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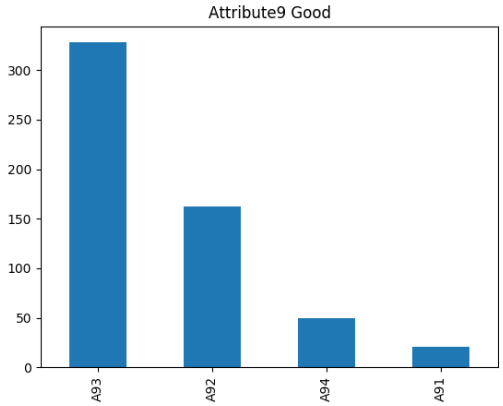
Attribute8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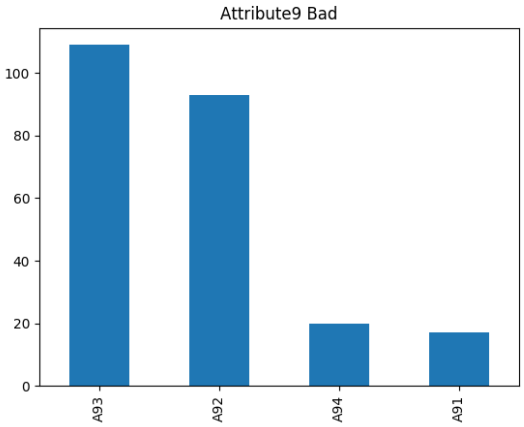
A92
A94
A91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20
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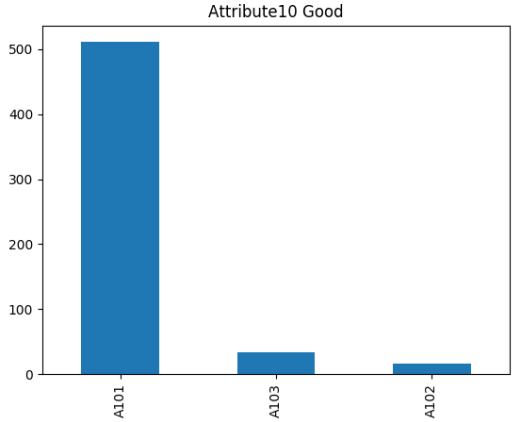
A93
A92
A94
A91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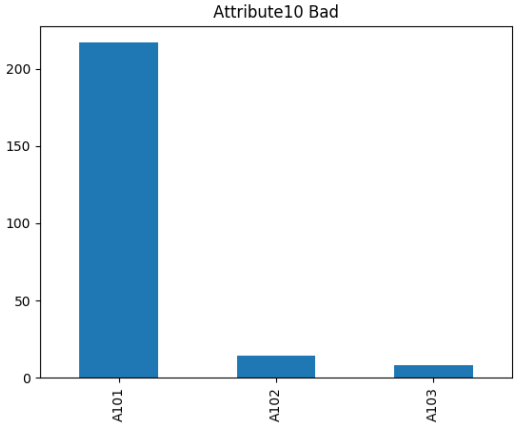
A101
A103
A102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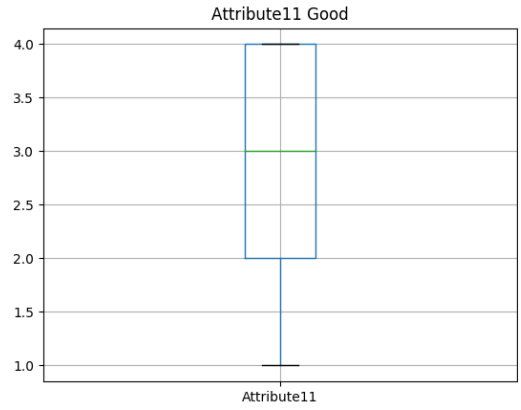
A101
A102
A103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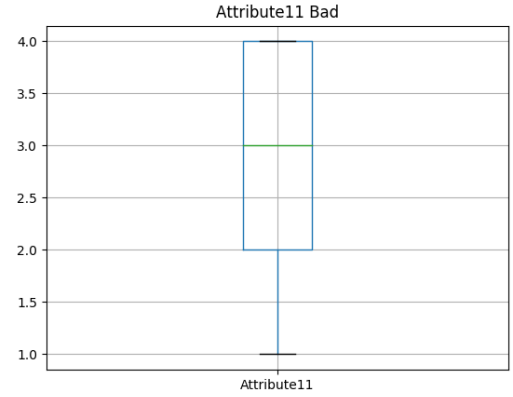
1.5
1.0
Attribute11


Attribute11 Bad
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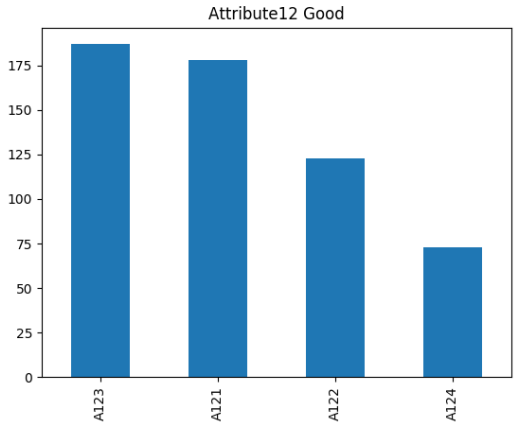
3.0
2.5
2.0
1.5
1.0
Attribute11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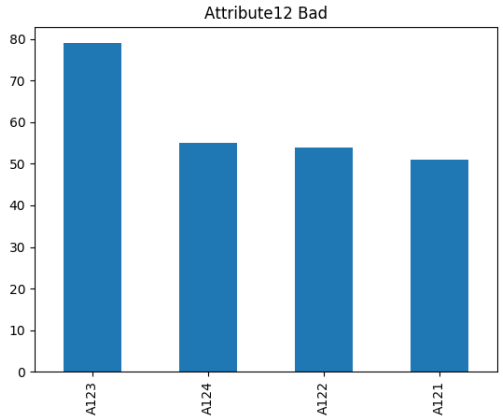
150
125
100
75
50
25
0
A123
A121
A122
A124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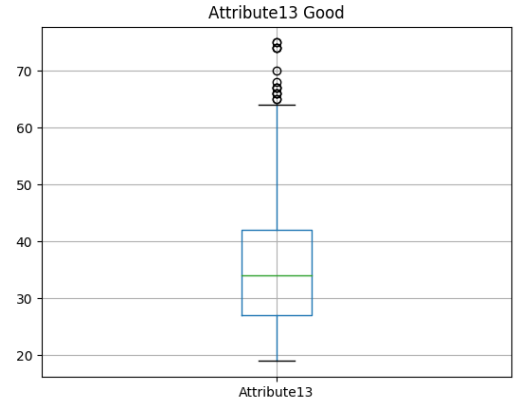
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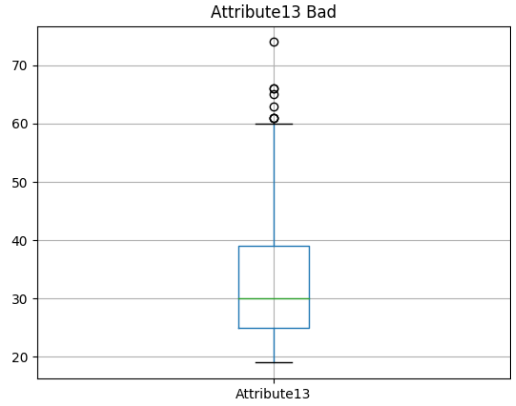
Attribute13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30
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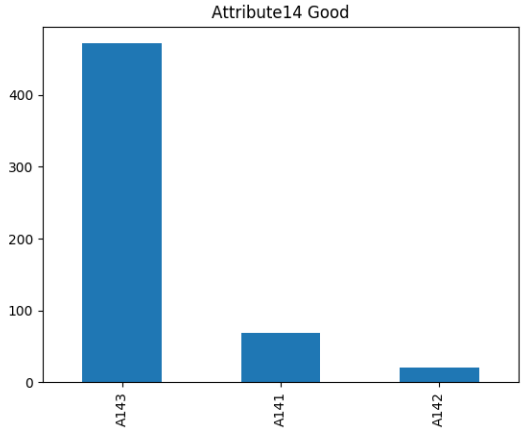
Attribute13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200
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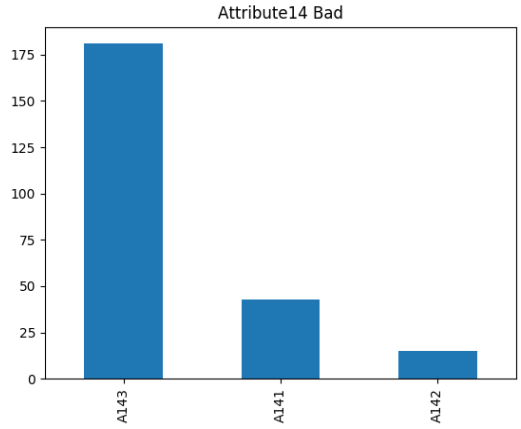
A143
A141
A142


Attribute14 Bad
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150
125
100
75
50
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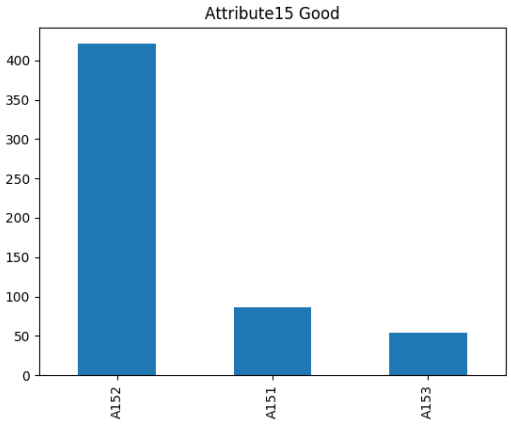
0
A143
A141
A142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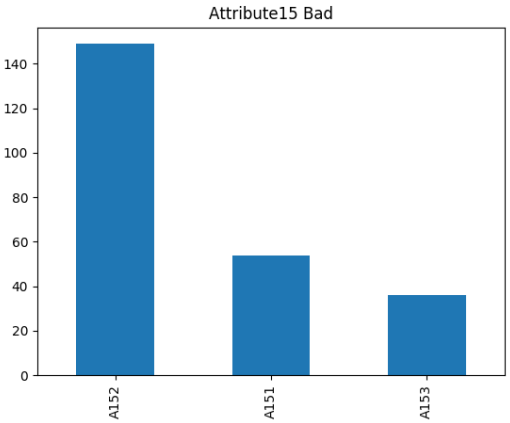
A153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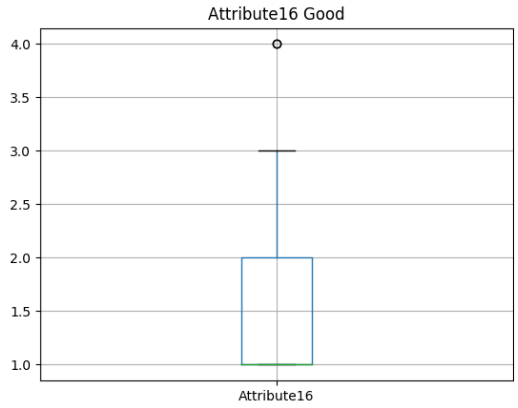
A153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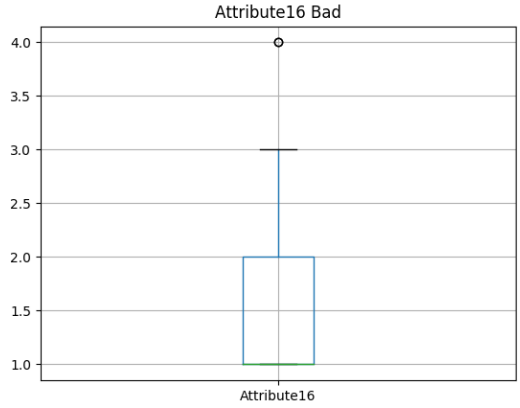
1.5
1.0
Attribute16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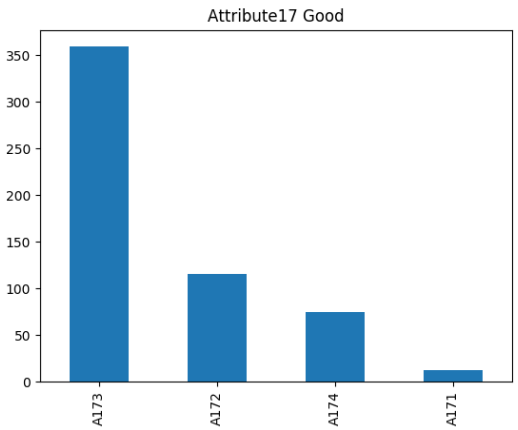
Attribute17 Good
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300
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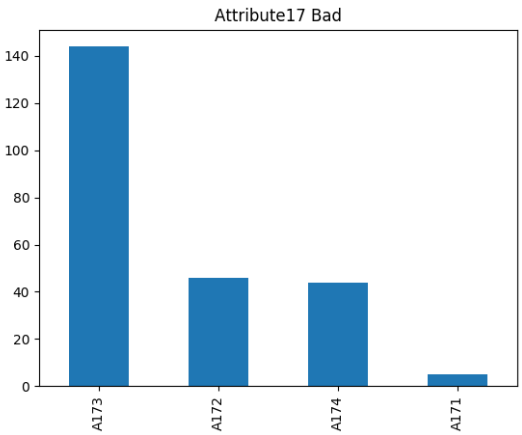
A173
A172
A174
A171


Attribute17 Bad
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120
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60
40
20
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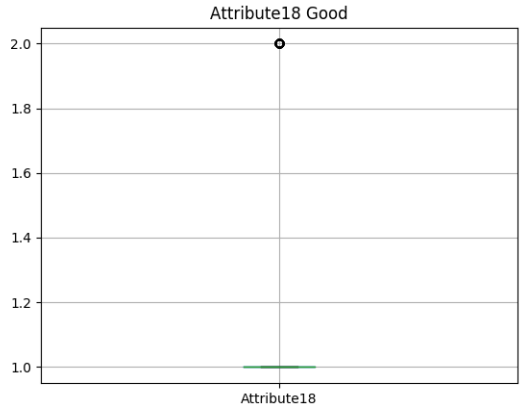
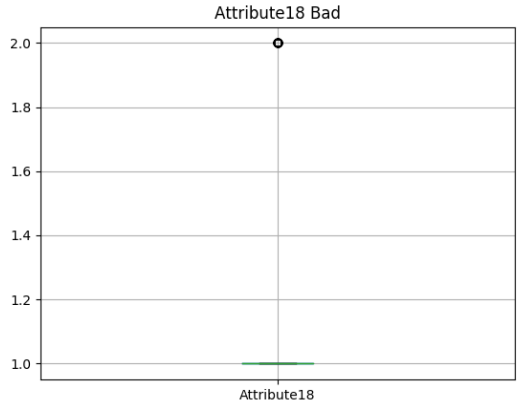
A173
A172
A174
A171


Attribute18 Good
2.0
1.8
1.6
1.4
1.2
1.0
Attribute18


Attribute18 Bad
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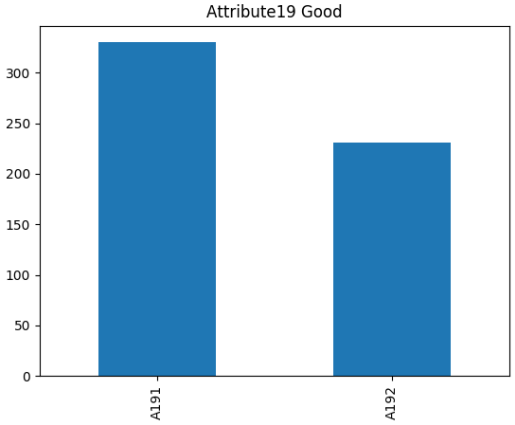
1.8
1.6
1.4
1.2
1.0
Attribute18


Attribute19 Good
300
250
200
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50
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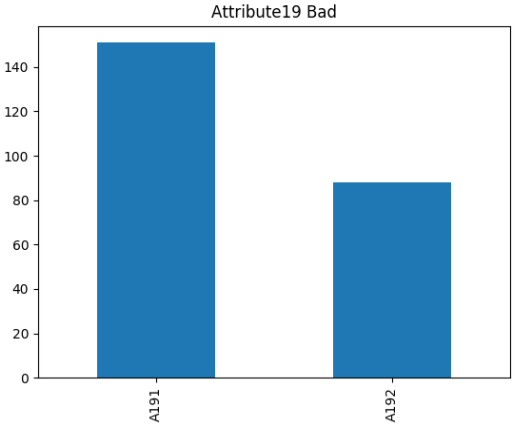
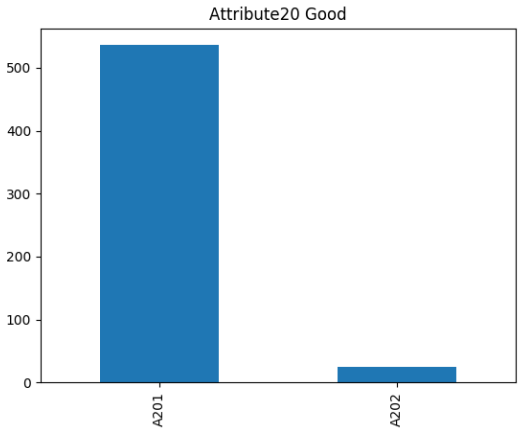
A191
A192


Attribute19 Bad
140
120
100
80
60
40
20
0
A191
A192


Attribute20 Good
500
400
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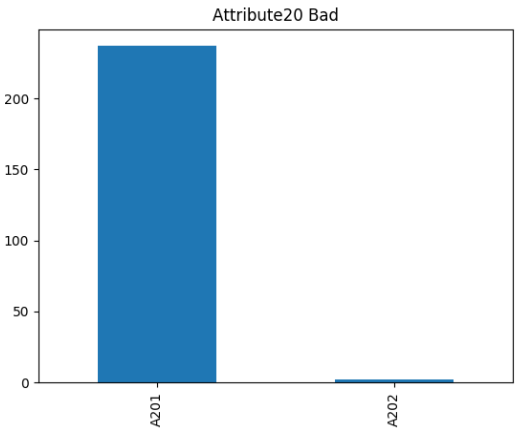
100
0
A201
A202


Attribute20 Bad
200
150
100
50
0
A201
A202

Παρατηρούμε στα παραπάνω διαγράμματα ότι σε κάποια attributes τα γραφήματα έχουν ελάχιστες διαφορές μεταξύ good και bad ενώ σε κάποια άλλα έχουν σημαντικές διαφορές. Πιστεύουμε ότι όσο πιο μεγάλες οι διαφορές ανάμεσα στα διαγράμματα, τόσο πιο χρήσιμη η πληροφορία που προσφέρει το συγκεκριμένο attribute στην κατηγοριοποίηση των δανειοληπτών.

Πιο συγκεκριμένα έντονες διαφορές παρατηρούνται στα attributes: 1, 2, 3, 5, 9, 12, 13 και 15. Αντιθέτως τα attributes: 8, 10, 11, 16, 18 και 19 έχουν αμελητέες διαφορές. Αναμένουμε τα attributes με τις μεγαλύτερες διαφορές να έχουν και μεγαλύτερο information gain.

Classification

Εκτελέσαμε τους κατηγοριοποιητές Naive Bayes, Random Forest και SVM στο train.tsv με 10 fold cross validation και τα αποτελέσματα τα οποία προέκυψαν είναι τα εξής:

Statistic Measure	Naive Bayes	Random Forest	SVM
Accuracy	0.6375	0.74625	0.70125

Επιλογή Features

Με βάση τα προηγούμενα αποτελέσματα συμπεραίναμε ότι ο Random Forest είναι η καλύτερη επιλογή για την κατηγοριοποίηση των πελατών. Επομένως το αρχείο testSet_Predictions.csv συμπληρώθηκε με τη χρήση του παραπάνω κατηγοριοποιητή.

Στον παρακάτω πίνακα παρουσιάζεται το information gain σε αύξουσα ταξινόμηση για κάθε attribute.

Attribute	Information Gain
Attribute20	0.21
Attribute10	0.52
Attribute18	0.6
Attribute14	0.83
Attribute19	0.97
Attribute16	1.12
Attribute15	1.14
Attribute17	1.41
Attribute9	1.52
Attribute3	1.71
Attribute6	1.72
Attribute8	1.81
Attribute1	1.82
Attribute11	1.85
Attribute12	1.95
Attribute7	2.15
Attribute4	2.69
Attribute2	3.73
Attribute13	5.26
Attribute5	9.52

Όντως τα γραφήματα με μεγάλες διαφορές ανάμεσα σε good και bad στο προηγούμενο ερώτημα βρίσκονται χαμήλα στον πίνακα, δηλαδή έχουν μεγάλο Information Gain. Αντίθετα τα γραφήματα με μικρές διαφορές έχουν μικρό Information Gain.

Τέλος παρουσιάζεται η διακύμανση του μέσου accuracy για 10 fold cross validation στον κατηγοριοποιητή Random Forest καθώς αφαιρούνται feature. Αξίζει να σημειωθεί ότι η σειρά με την οποία αφαιρούνται τα features ακολουθούν την σειρά με την οποία είναι στον προηγούμενο πίνακα, δηλαδή αφαιρούνται πρώτα τα attributes με το μικρότερο information gain.