

POLITECNICO
MILANO 1863

Course Title

Academic Year

Author

University

Degree

Contents

1 Section **2**

List of Definition **5**

List of Assumption **5**

List of Principle **5**

List of Theorem **5**

List of Corollary **5**

List of Proposition **5**

List of Lemma **5**

List of Remark **5**

List of Property **5**

List of Test **5**

List of Notation **5**

List of Figure **5**

List of Algorithms **6**

1 Section

In this part of the document the various sections should be added.

Definition 1.1 (Definition)**.**
This is a definition. If you want to see the implementation, it is found in `0/theorem.tex`*.*

If you want to hide a *List of ...* because you did not use some of them, you can hide it by going to `0/list_of_theorem`.

acronym (ACR): this is a glossary item, it is found in `0/list_of_glossary.tex`, if you want to add a new type of glossary you add it in `0/glossary.tex`.

(definition 1.1): this is a reference to a definition. (algorithm 1): this is a reference to an algorithm.

Algorithm 1 This is an algorithm

Input:
a ▷ number
b ▷ number
Output:
$a + b$ ▷ number

```
1: procedure ALGORITHM(a, b)
2:     return a + b
3: end procedure
```

Algorithm 2 SUM(a, b)

Input:
a: integer ▷ number
b: integer ▷ number
Output:
$a + b$: integer ▷ number

```
1: return a + b
```

Algorithm 3 Very long algorithm

Input:
`matrix` ▷ unsorted `matrix` $\in \mathbb{M}at_{k\times k}$ whose $\frac{k}{2} \times \frac{k}{2}$-subarrays are roughly sorted
Output:
`matrix` ▷ roughly sorted `matrix` $\in \mathbb{M}at_{k\times k}$

```
for row in matrix do
    if row in upper half of the matrix then
        sortAscending(row)
    else
        sortDescending(row)
    end if
end for
for column in matrix do
    sort(column)
end for
for row in matrix do
    if row is odd then
        sortAscending(row)
    else
        sortDescending(row)
    end if
end for
for column in matrix do
    sort(column)
end for
```

Algorithm 4 Rotatesort Algorithm

Input:
`matrix` ▷ unsorted `matrix` $\in \mathbb{M}at_{n\times n}$
Output:
`matrix` ▷ sorted in row-major `matrix` $\in \mathbb{M}at_{n\times n}$

```
for verticalSlice in matrix do
    balance(verticalSlice)    ▷ reduces the number of dirty rows to at most √n
end for
unblock(matrix)
for horizontalSlice in matrix do
    balance(horizontalSlice)
end for
unblock(matrix)
shear(matrix)
shear(matrix)
for row in matrix do
    sort(row)
end for
```

	Standard Machine	Variant Machine
`randomKeyGuess`	$2^{36} - 2^{33}$	$2^{36} - 2^{10}$
`machineKeys`	$2^{10} \cdot 2^{23} = 2^{33}$	2^{10}

Table 1: Machine Inputs

Machine Learning	Machine Learning Type	Use Case
Hierarchical Clustering	Unsupervised	discover anomalous patterns
k-means Clustering	Unsupervised	grouping data into clusters based on their similarity
Linear Regression	Supervised	compute the risk score of fraud and the monetary loss prediction
Logistic Regression	Supervised	binary classification
Decision Tree	Supervised	well-structure data, classify them
Neural Network	Supervised	large. complex and non-linear dataset
Bagging	Ensemble Method	reduce the variance
Boosting	Ensemble Method	reduce the bias

Table 2: Choice of Machine Learning Algorithm for Fraud Detection

List of Definition

Definition 1.1 – Definition 2

List of Assumption

List of Principle

List of Theorem

List of Corollary

List of Proposition

List of Lemma

List of Remark

List of Property

List of Test

List of Notation

List of Figures

List of Algorithms

1 This is an algorithm 2
2 SUM(a, b) 2
3 Very long algorithm 3
4 Rotatesort Algorithm 3