

**Désignation du document**  
*Document name*

**Cahier des Charges TPCPOO**

**Affaire**  
*Product*

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**Diaballik**

**Sous-ensemble**  
*Subassembly*

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**Classé 1E ou équiv.**

☐

**Non Classé**

*Safety classification*

**Document contractuel** (pour le client)  
*Contractual document (for customer)*

oui  
*yes*

☐

non  
*no*

☒

**Nbre de pages**  
*Number of pages*

**7**

**Code projet**  
*Project code*

*Niv1 / Level1*

*Niv2 / Level2*

E.RE01

26.02.04

**Diffusion interne:**  
*Internal distribution*

INSA Rennes - dép INFO

**Diffusion externe:**  
*External distribution*

Tampon archivage / *Archive stamp*

☐

**Version française**

Rédigé par <i>Written by</i>	Vérifié par <i>Checked by</i>	Approuvé par <i>Approved by</i>
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**English version**

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**TABLEAU DE MISE A JOUR**  
*Record of revisions*

Indice /date Rédigé par <i>Revision letter / date Written by</i>	Pages modifiées <i>Modified pages</i>	Origine et désignation de la modification <i>Origin and designation of the modification</i>
2017/06/22 A. Blouin		Edition originale

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## 1 INTRODUCTION

### 1.1 Goal of the document

This document is the requirements document (« cahier des charges ») of the TPCPOO 4INFO project of the computer science department of the INSA of Rennes. The term “Diaballik” refers to as this project throughout this document. It describes the requirements of the project to develop.

### 1.2 Definitions

OOP	Object-Oriented Programming
OOM	Object-Oriented Modelling
UML	Unified Modelling Language
GUI	Graphical User Interface

### 1.3 Reference documents and bibliography

#### 1.3.1 Bibliography

Code	Intervenants	Désignation
[DesignPattern]	Arnaud Blouin	Hard-copy of the OOP / OOM module on the design pattern in software engineering.
[OOP]	Éric Anquetil	Hard-copy of the OOP / OOM module on OOP with C++ and WPF.
[OOM]	Maud Marchal / Arnaud Blouin	Hard-copy of the UML module (3INFO and 4INFO).
[WPF]	Pascal Fresnay	Hard-copy of the WPF talk.

### 1.4 Description of the project

Please use the forum available on moodle to ask questions on the project or on any OOP/OOM concepts: <http://coursonline.insa-rennes.fr/mod/forum/view.php?id=5522>. Questions you ask may interest other students or may be answered by other students who already faced the same issue.

This document is an illustrative example of an industrial requirements document. Like any requirements document written by humans – as far as we know – it (un-)voluntarily contains errors and ambiguities. The use of the forum is thus mandatory to discuss them. Because of the education purpose of this document, we took few liberties regarding the formal content and structure of such a requirements document. A requirements document describe the 'what' (the game Diaballik we want). It does not define the 'how'. The excessive use of 'shall' is normal in a requirements document.

See <http://www.in2p3.fr/actions/formation/ConduiteProjet06/doc-dialinas.pdf> or <http://homepages.laas.fr/kader/Hooks.pdf> for more details about requirements.

The rules of the game are detailed here: <http://videoregles.net/videoregle/diaballik>

The following requirements detail the rules with some specific changes. The following picture gives a glimpse of the game.

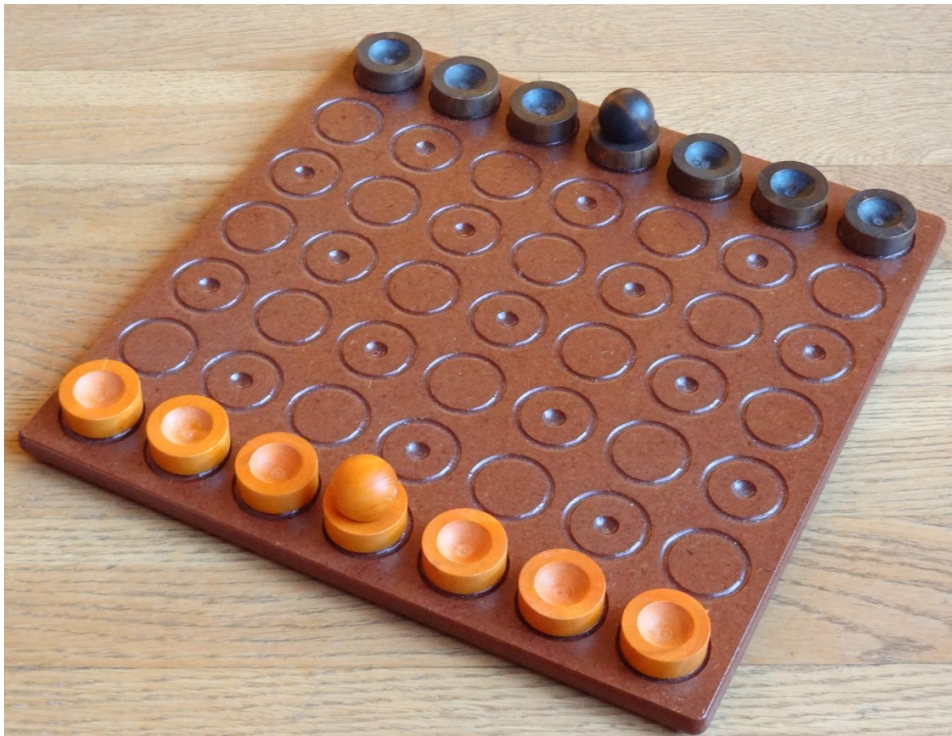


Figure 1: Physical board of the Diaballik game

## 2 RULES OF THE GAME

### 2.1 Gameplay

The following requirements describe the gameplay of Diaballik.

#### [R21\_1\_GAME\_PLAYERS]

A game shall involve a two players. A player shall have a name.

#### [R21\_2\_GAME\_BOARD]

The game board shall be a square and composed of tiles. The width of the board shall contain an odd number of tiles. Figure 1 shows two kinds of tiles. This is purely decorative.

#### [R21\_3\_GAME\_PIECES]

Each player shall have an equal number of pieces. The number of pieces shall be the size of the board. The colour of the pieces shall be the colour of the player.

#### [R21\_4\_GAME\_BALL]

Each player shall have one ball. The ball shall be always carried by a piece.

#### [R21\_5\_GAME\_COLOUR]

A player shall have a colour. The two players of a game shall not have the same colour. The colour of a player shall be the colour of his pieces and his ball.

#### [R21\_6\_GAMEPLAY\_TURN]

The game shall be a turn-by-turn game.

#### **[R21\_8\_GAMEPLAY\_ACTIONS]**

A player shall do one to three actions per turn. Actions shall be: move the ball; move a piece.

#### **[R21\_9\_GAMEPLAY\_MOVE\_BALL]**

A ball carried by a piece shall be moved to another piece of the same player if there is a horizontal, vertical, diagonal piece-free line between these two pieces.

#### **[R21\_10\_GAMEPLAY\_MOVE\_PIECE]**

A piece shall be moved to the direct left, right, up, or bottom tile if free.

#### **[R21\_11\_GAMEPLAY\_MOVE\_PIECE\_WITH\_BALL]**

A piece shall not move if it carries the ball.

#### **[R21\_12\_GAMEPLAY\_HOW\_START]**

The first player to play is selected randomly.

#### **[R21\_13\_GAME\_TURN\_ORDER]**

Each player shall play one after another.

#### **[R21\_14\_GAME\_TURN\_AUTO]**

When his three actions are performed, the game shall automatically allow the next player to play.

#### **[R21\_15\_GAME\_TURN\_MANUAL]**

A player shall be able to manually end his turn even if the three possible actions are not all done.

#### **[R21\_16\_GAME\_TURNS]**

A game shall not have a predefined number of turns.

## **2.2 Game scenario**

By game scenario, we mean the position of the pieces on the board that can vary depending on the selected game scenario.

#### **[R22\_1\_SCENARIO\_STANDARD]**

The standard board shall be the one depicted by Figure 1.

#### **[R22\_2\_SCENARIO\_BALL\_RANDOM]**

The random ball scenario shall place the ball randomly of the line of pieces of each player.

#### **[R22\_2\_SCENARIO\_ENEMY\_AMONG\_US]**

The enemy-among-us scenario shall place randomly but the centre: two pieces of the other player in the line of the player; and of course, two pieces of the player in the line of the other player.

## **2.3 I.A.**

#### **[R23\_1\_PLAYER\_KINDS]**

One human player shall play with another human player (on the same computer) or with an I.A.

#### **[R23\_2\_IA\_LEVELS]**

A player shall play against different IAs.

**[R23\_3\_IA\_LEVEL\_NOOB]**

The noob IA shall do actions randomly.

**[R23\_4\_IA\_LEVEL\_STARTING]**

The starting IA shall move the ball randomly and study the other player's pieces to avoid losing the game.

**[R23\_5\_IA\_LEVEL\_PROGRESSIVE]**

The IA shall start with the "noob" level and after 10 turns shall change to the "starting" level.

## **2.4 End game**

**[R24\_1\_VICTORY]**

A player shall win when his ball is on the extreme opposite line (of the line this player shall start the game) of the board.

## **2.5 Graphical user interface**

**[R25\_1\_BOARD\_VIEW]**

The board and its content shall be graphically represented using a 2D top view.

**[R25\_2\_SELECTION]**

A piece and a ball shall be selectable by its player.

**[R25\_3\_PIECE\_INFORMATION]**

The possible moves of a selected piece and its possible carried ball shall be displayed.

**[R25\_4\_SAVE\_LOAD\_GAME]**

A player shall be able to save and load a game.

**[R25\_5\_REPLAY]**

A player shall be able to replay a saved game.

**[R25\_6\_GAME\_INITIALISATION]**

The kind of game, of players, their name and colours shall be selected during the initialisation phase before the beginning of the game.

**[R25\_7\_GAME\_CREATION]**

The end of the initialisation phase shall lead to the creation and the beginning of the game.

## **3 SOFTWARE DEVELOPMENT**

**[R3\_1\_DEV\_LANGUAGE\_LIB]**

The C++ language shall be used to develop the starting IA algorithm to be encapsulated in a library.

**[R3\_2\_DEV\_LANGUAGE\_MAIN]**

The C# language and WPF shall be used to develop Diaballik but the algorithm library.

**[R3\_3\_DEV\_ENV]**

Visual Studio 2017 Enterprise shall be used to develop Diaballik.