



UNIVERSITAT POLITÈCNICA DE CATALUNYA  
BARCELONATECH

Escola Superior d'Enginyeries Industrial,  
Aeroespacial i Audiovisual de Terrassa

# Project for developing a project management simulation game for engineers

Document:

Annexes

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**MASTER FINAL THESIS**



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## **Annex 1: Game components to print**

## Project: Development of a modular and sustainable smartphone

*Phone it Co.* has contacted you to develop a new smartphone. The three most important requisites are that it needs to be *modular*, *sustainable* and *affordable*. This means that the device must be constructed from parts that can be interchangeable by the user, that the materials and fabrication process are ecofriendly and that its price is not too high.

Project details:

- **Budget:** 150.000€
- **Duration:** 4 months
- **Project start:** 02/01/2023
- **Project delivery:** 28/04/2023



### Event

One of your team has turned positive in Covid-19. He has 10 days of medical leave. The rest of team will be 3 days in quarantine. (Employee ID: 005)

### Event

A member of your team is going to have a wedding and will have holidays for 15 natural days. (Employee ID: 003)

### Event

All the female employees are going on a strike for 5 days.

### Event

Half of the team goes on holidays for 1 week. (Employees ID: 002, 004, 005)

### Event

Due to lack of motivation among the employees, they will spend more time on their current tasks. (+1 in each subtask for 1 week)

### Event

An employee has received a better job offer and is thinking to accept it. He demands a raise of 500€/Weekly. (Employee ID: 002)

### Event

One of you team has broken his leg and will be at home for two weeks. (Employee ID: 002)

### Event

There is an international Phone conference next friday. The whole team will attend.

### Event

Thanks to the good attitude from the project manager, employees will complete their tasks faster. (-1 in each subtask for 1 week)

### Event

One of your team is getting maternity/paternity leave and will not work in 4 months. (Employee ID: 001)

### Event

There has been floods in the city and it has damaged the offices. Employees will have to work at home for 5 natural days. (+1 in each subtask)

### Event

One of your team has just been vaccinated from Covid-19 and does not feel ok. He will have a medical leave for 2 days. (Employee ID: 003)

**Event**

There is a heavy snowfall and the employees will not be able to go to the office. They will have to work at home for 5 natural days. (+1 in each subtask)

**Event**

The client has informed that you will have one month more to work on the project.

**Event**

An employee has decided to leave the project since he doesn't feel comfortable. (Employee ID: 004)

**Event**

Employees must receive a course in Management that lasts one week. (Everyone can do Management tasks)

**Event**

Nothing has happened.

**Event**

Nothing has happened

**Event**

An employee has decided to take a sabbatical and will only be with the company for one more week. (Employee ID: 001)

**Event**

Nothing has happened.

**Event**

Nothing has happened.

**Mark**  
Legal advisor  
Specialty:  
**Legality**

Daily rate(TC): 480€  
Weekly salary (PC): 850€

**Sophie**  
Industrial design Engineer  
Specialty:  
**Engineering/Design**

Daily rate(TC): 240€  
Weekly salary (PC): 1000€

**Thomas**  
Industrial Engineer  
Specialty:  
**Engineering**  
(+1 in subtasks)

Daily rate(TC): 120€  
Weekly salary (PC): 550€

**Peter**  
Product designer  
Specialty:  
**Design**

Daily rate(TC): 240€  
Weekly salary (PC): 1125€

**Eva**  
Project Manager  
Specialty:  
**Management**  
(-1 in subtasks)

Daily rate(TC): 50€  
Weekly salary (PC): 1250€

**Carol**  
Business & Tech Analyst  
Specialty:  
**Analysis**

Daily rate(TC): 240€  
Weekly salary (PC): 925€

**Sam**  
Management Engineer  
Specialty:  
**Management/Eng.**  
(-1 in subtasks)

Daily rate(TC): 560€  
Weekly salary (PC): 1625€

**Marta**  
Mechanical Engineer  
Specialty:  
**Engineering**

Daily rate(TC): 400€  
Weekly salary (PC): 1000€

**Clara**  
Project Manager  
Specialty:  
**Management/Analysis**

Daily rate(TC): 400€  
Weekly salary (PC): 1100€

**Maria**  
Legal advisor  
Specialty:  
**Legality**  
(-1 in subtasks)

Daily rate(TC): 960€  
Weekly salary (PC): 1750€

**Alex**  
Electronics Engineer  
Specialty:  
**Engineering**

Daily rate(TC): 400€  
Weekly salary (PC): 900€

**Paul**  
Product designer  
Specialty:  
**Design/Management**  
(-1 in subtasks)

Daily rate(TC): 560€  
Weekly salary (PC): 1500€

**Paula**  
Informatics Engineer  
Specialty:  
**Engineering**  
(-1 in subtasks)

Daily rate(TC): 480€  
Weekly salary (PC): 1250€

**Patrick**  
Graphic designer  
Specialty:  
**Design**

Daily rate(TC): 400€  
Weekly salary (PC): 850€

**David**  
Entrepreneur  
Specialty:  
**Management**

Daily rate(TC): 280€  
Weekly salary (PC): 1000€

**Olivia**  
Business Administration  
Specialty:  
**Analysis/Design**  
(+1 in subtasks)

Daily rate(TC): 120€  
Weekly salary (PC): 400€

**Pedro**  
Business Administration  
Specialty:  
**Management**

Daily rate(TC): 320€  
Weekly salary (PC): 900€

**Louis**  
Industrial Design Engineer  
Specialty:  
**Engineering/Design**

Daily rate(TC): 480€  
Weekly salary (PC): 1050€

**Anna**  
Industrial Engineer  
Specialty:  
**Engineering**  
(+1 in subtasks)

Daily rate(TC): 120€  
Weekly salary (PC): 475€

**Gloria**  
Electronics Engineer  
Specialty:  
**Engineering/Analysis**  
(-1 in subtasks)

Daily rate(TC): 560€  
Weekly salary (PC): 1625€

**Julia**  
Technical analyst  
Specialty:  
**Analysis**

Daily rate(TC): 320€  
Weekly salary (PC): 900€

**Javier**  
Mechanical Engineer  
Specialty:  
**Design/Eng./Analysis**  
(-1 in subtasks)

Daily rate(TC): 800€  
Weekly salary (PC): 2000€

**Patricia**  
Designer  
Specialty:  
**Design**

Daily rate(TC): 260€  
Weekly salary (PC): 850€


**Teamwork organisation** 1.1.

Team forming and definition of positions.

Subtasks: 🧑‍🎓

- 1. Team members selection +3
- 2. Group meeting/introduction +2
- 3. Role definition +3
- 4. Objectives to be achieved +2

Specialty: Management




**Project timeline** 1.2.

Definition of the amount of work there will be for each task within a schedule.

Subtasks: 🧑‍🎓

- 1. Tasks definition +4
- 2. Task responsible definition +3
- 3. Gantt creation +3

Specialty: Management/Analysis




**Market research** 1.3.

Study of the current mobile industry.

Subtasks: 🧑‍🎓

- 1. Smartphone state of art analysis +3
- 2. Sustainability in technology analysis +3
- 3. Products with similar characteristics analysis +2
- 4. Drafting +2

Specialty: Design/Analysis




**Financial studies** 1.4.

Economic analysis to make good use of the budget.

Subtasks: 🧑‍🎓

- 1. Fixed assets analysis +2
- 2. Budget deviations analysis +2
- 3. Budget upper limit analysis +2
- 4. Tasks costs +4

Specialty: Analysis



**Design analysis** 2.1.

Deep understanding of the design specifications for the project.

Subtasks: 🧑‍🎓

- 1. Recopilation of design requirements +2
- 2. Viability analysis +3
- 3. Meeting for more specifications +1

Specialty: Design/Analysis




**User stories creation** 2.2.

Analysis on how users interact with smartphones.

Subtasks: 🧑‍🎓

- 1. Stakeholders definition +2
- 2. End users definition +2
- 3. Smartphone interactions analysis +3

Specialty: Design




**First sketches** 2.3.

Initial drawings of possible designs for the final product.

Subtasks: 🧑‍🎓

- 1. Design brainstorming +5
- 2. Sketching +4

Specialty: Design/Engineering




**Advanced sketches** 2.4.

Detailed sketch creation of the final design.

Subtasks: 🧑‍🎓

- 1. Possible final design election +5
- 2. Detailed sketching +4

Specialty: Design



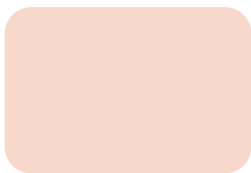
**3D design** 2.5.

3D modelling of the device to have a more realistic view of how the design will be.

Subtasks: 🧑‍🎓

- 1. 3D modelling +5
- 2. 2D representation of design +3

Specialty: Design/Engineering



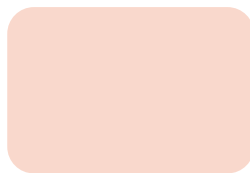
**Interfaces design** 2.6.

Design of all interfaces that the device will have.

Subtasks: 🧑‍🎓

- 1. Interfaces setup +4
- 2. Interfaces design elaboration +5

Specialty: Design



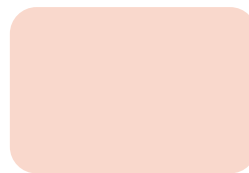
**Programming** 2.7.

Software development for the device.

Subtasks: 🧑‍🎓

- 1. General programming +6

Specialty: Engineering



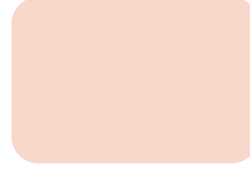
**Dimension analysis** 3.1.

Size definition of the device.

Subtasks: 🧑‍🎓

- 1. Ergonomic analysis +5
- 2. Sizing comparison +3
- 3. Final size decision +3

Specialty: Analysis/Design



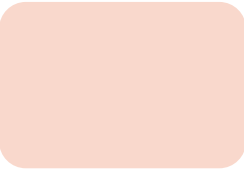
**Materials** 3.2.

Material definition of the different parts the final device will have.

Subtasks: 🕒

- 1. Materials analysis +4
- 2. Materials election +3

Specialty: Design/Engineering



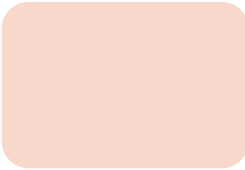
**Detailed modelling** 3.3.

Precise 3D modelling regarding dimensions and materials.

Subtasks: 🕒

- 1. Final 3D Modelling +4
- 2. Rendering +3

Specialty: Design/Engineering



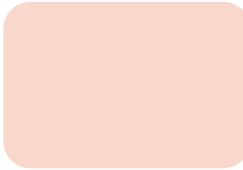
**Fabrication process** 3.4.

Definition on how the device will be manufactured.

Subtasks: 🕒

- 1. Fabrication processes analysis +3
- 2. Fabrication process election +3

Specialty: Design/Engineering



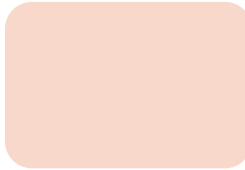
**Applicable legislation** 3.5.

Legislative analysis to ensure the compliment of all regulations.

Subtasks: 🕒

- 1. Design & Ergonomic normative +3
- 2. Technology normative +2
- 3. Sustainability normative +2
- 4. Quality normative +2

Specialty: Legal



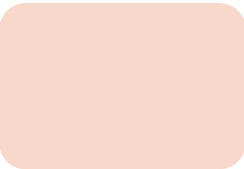
**Prototype fabrication** 3.6.

Development of prototypes to get a closer look at the final design of the device.

Subtasks: 🕒

- 1. 3D printing design +4
- 2. 3D printing process +3

Specialty: Design/Engineering



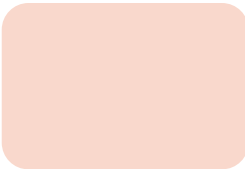
**Testing study** 4.1.

Analysis of what should be tested.

Subtasks: 🕒

- 1. Testing analysis +4
- 2. Tests setup +3

Specialty: Design/Engineering



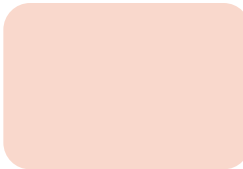
**User interface testing** 4.2.

Testing of the interface between the applications and the end user.

Subtasks: 🕒

- 1. Functional testing +3
- 2. Visual design testing +3
- 3. Performance testing +3
- 4. Usability testing +3

Specialty: Design/Engineering



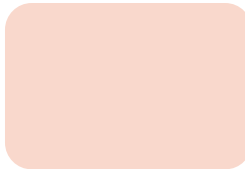
**Durability testing** 4.3.

Testing of the device toughness.

Subtasks: 🕒

- 1. Drop/bump resistance testing +3
- 2. Water resistance testingf +3
- 3. Consistency testing +3
- 4. Quality testing +3

Specialty: Design/Engineering



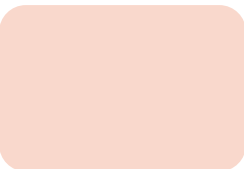
**Presentation preparation** 5.1.

Making of the presentation that will be made to the company.

Subtasks: 🕒

- 1. Gathering relevant information +2
- 2. Template creation +3
- 3. Presentation development +3
- 4. Q&A preparation +3

Specialty: All



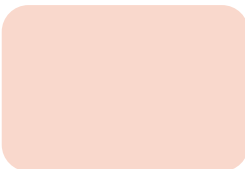
**Presentation to company** 5.2.

Presentation of the final product to the responsables of the company.

Subtasks: 🕒

- 1. Presentation rehearsal +4
- 2. Final presentation +4

Specialty: All





TO DO

W.I.P

DONE

1

2

3

4

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Milestones

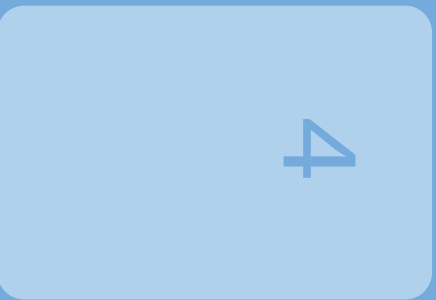
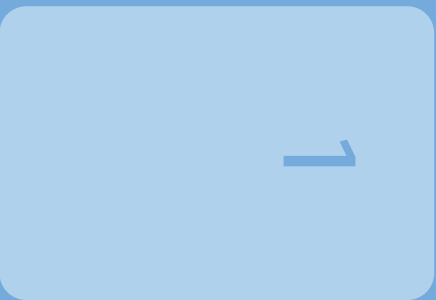
1

2

3

4

5



# Project calendar sheet

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Dec. 2022	26 <small>Week 52</small> <input type="checkbox"/>	27 <input type="checkbox"/>	28 <input type="checkbox"/>	29 <input type="checkbox"/>	30 <input type="checkbox"/>	31 <input type="checkbox"/>	1 <input type="checkbox"/>
Jan. 2023	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	8 <input type="checkbox"/>
	9 <small>Week 2</small> <input type="checkbox"/>	10 <input type="checkbox"/>	11 <input type="checkbox"/>	12 <input type="checkbox"/>	13 <input type="checkbox"/>	14 <input type="checkbox"/>	15 <input type="checkbox"/>
	16 <small>Week 3</small> <input type="checkbox"/>	17 <input type="checkbox"/>	18 <input type="checkbox"/>	19 <input type="checkbox"/>	20 <input type="checkbox"/>	21 <input type="checkbox"/>	22 <input type="checkbox"/>
	23 <small>Week 4</small> <input type="checkbox"/>	24 <input type="checkbox"/>	25 <input type="checkbox"/>	26 <input type="checkbox"/>	27 <input type="checkbox"/>	28 <input type="checkbox"/>	29 <input type="checkbox"/>
	30 <small>Week 5</small> <input type="checkbox"/>	31 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
Feb. 2023	6 <small>Week 6</small> <input type="checkbox"/>	7 <input type="checkbox"/>	8 <input type="checkbox"/>	9 <input type="checkbox"/>	10 <input type="checkbox"/>	11 <input type="checkbox"/>	12 <input type="checkbox"/>
	13 <small>Week 7</small> <input type="checkbox"/>	14 <input type="checkbox"/>	15 <input type="checkbox"/>	16 <input type="checkbox"/>	17 <input type="checkbox"/>	18 <input type="checkbox"/>	19 <input type="checkbox"/>
	20 <small>Week 8</small> <input type="checkbox"/>	21 <input type="checkbox"/>	22 <input type="checkbox"/>	23 <input type="checkbox"/>	24 <input type="checkbox"/>	25 <input type="checkbox"/>	26 <input type="checkbox"/>
	27 <small>Week 9</small> <input type="checkbox"/>	28 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
Mar. 2023	6 <small>Week 10</small> <input type="checkbox"/>	7 <input type="checkbox"/>	8 <input type="checkbox"/>	9 <input type="checkbox"/>	10 <input type="checkbox"/>	11 <input type="checkbox"/>	12 <input type="checkbox"/>
	13 <small>Week 11</small> <input type="checkbox"/>	14 <input type="checkbox"/>	15 <input type="checkbox"/>	16 <input type="checkbox"/>	17 <input type="checkbox"/>	18 <input type="checkbox"/>	19 <input type="checkbox"/>
	20 <small>Week 12</small> <input type="checkbox"/>	21 <input type="checkbox"/>	22 <input type="checkbox"/>	23 <input type="checkbox"/>	24 <input type="checkbox"/>	25 <input type="checkbox"/>	26 <input type="checkbox"/>
	27 <small>Week 13</small> <input type="checkbox"/>	28 <input type="checkbox"/>	29 <input type="checkbox"/>	30 <input type="checkbox"/>	31 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>
Apr. 2023	3 <small>Week 14</small> <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	8 <input type="checkbox"/>	9 <input type="checkbox"/>
	10 <small>Week 15</small> <input type="checkbox"/>	11 <input type="checkbox"/>	12 <input type="checkbox"/>	13 <input type="checkbox"/>	14 <input type="checkbox"/>	15 <input type="checkbox"/>	16 <input type="checkbox"/>
	17 <small>Week 16</small> <input type="checkbox"/>	18 <input type="checkbox"/>	19 <input type="checkbox"/>	20 <input type="checkbox"/>	21 <input type="checkbox"/>	22 <input type="checkbox"/>	23 <input type="checkbox"/>
	24 <small>Week 17</small> <input type="checkbox"/>	25 <input type="checkbox"/>	26 <input type="checkbox"/>	27 <input type="checkbox"/>	28 <input type="checkbox"/>	29 <input type="checkbox"/>	30 <input type="checkbox"/>
May. 2023	1 <small>Week 18</small> <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>
	8 <small>Week 19</small> <input type="checkbox"/>	9 <input type="checkbox"/>	10 <input type="checkbox"/>	11 <input type="checkbox"/>	12 <input type="checkbox"/>	13 <input type="checkbox"/>	14 <input type="checkbox"/>
	15 <small>Week 20</small> <input type="checkbox"/>	16 <input type="checkbox"/>	17 <input type="checkbox"/>	18 <input type="checkbox"/>	19 <input type="checkbox"/>	20 <input type="checkbox"/>	21 <input type="checkbox"/>
	22 <small>Week 21</small> <input type="checkbox"/>	23 <input type="checkbox"/>	24 <input type="checkbox"/>	25 <input type="checkbox"/>	26 <input type="checkbox"/>	27 <input type="checkbox"/>	28 <input type="checkbox"/>
	29 <small>Week 22</small> <input type="checkbox"/>	30 <input type="checkbox"/>	31 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>
Jun. 2023	5 <small>Week 23</small> <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	8 <input type="checkbox"/>	9 <input type="checkbox"/>	10 <input type="checkbox"/>	11 <input type="checkbox"/>
	12 <small>Week 24</small> <input type="checkbox"/>	13 <input type="checkbox"/>	14 <input type="checkbox"/>	15 <input type="checkbox"/>	16 <input type="checkbox"/>	17 <input type="checkbox"/>	18 <input type="checkbox"/>
	19 <small>Week 25</small> <input type="checkbox"/>	20 <input type="checkbox"/>	21 <input type="checkbox"/>	22 <input type="checkbox"/>	23 <input type="checkbox"/>	24 <input type="checkbox"/>	25 <input type="checkbox"/>
	26 <small>Week 26</small> <input type="checkbox"/>	27 <input type="checkbox"/>	28 <input type="checkbox"/>	29 <input type="checkbox"/>	30 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>

## Budget control sheet

	Fix costs - PC (€)	Temporal cost - TC (€)	Available budget (€)	Perc. of budget spent (%)	Perc. of days that have passed (%)
Week 52					
Week 1					5,9
Week 2					11,8
Week 3					17,6
Week 4					23,5
Week 5					29,4
Week 6					35,3
Week 7					41,2
Week 8					47,1
Week 9					52,9
Week 10					58,8
Week 11					64,7
Week 12					70,6
Week 13					76,5
Week 14					82,4
Week 15					88,2
Week 16					94,1
Week 17					100
Week 18	+3000				
Week 19	+3000				
Week 20	+3000				
Week 21	+3000				
Week 22	+3000				
Week 23	+3000				
Week 24	+3000				
Week 25	+3000				
Week 26	+3000				

## **Annex 2: Game Manual**



# The Project Management Game

## Game manual



This manual contains a detailed explanation of all *Project it.* rules. It is recommended to read it since the game has several points to consider. Once you have understood all aspects of the game, it's time to start managing the project and having fun!

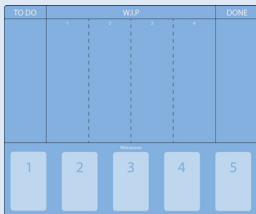
# Game components

## 1. Presentation Card



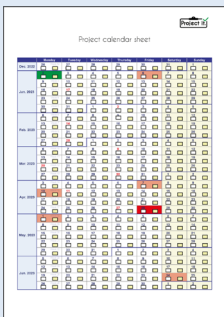
This is the card that shows the relevant information about the project that must be accomplished throughout the game. It displays information about the budget, duration, start and end of the project.

## 2. Kanban Board



The players will have to display the tasks on the Kanban Board. Tasks that are not yet started must be placed in the *To do* column, those tasks in which the employees are working on must be on the *W.I.P.* columns and once they are ended, they must be in the *Done* column. After all tasks of a milestone have been completed, the tasks should be stored at the bottom in the corresponding slot.

## 3. Calendar sheet



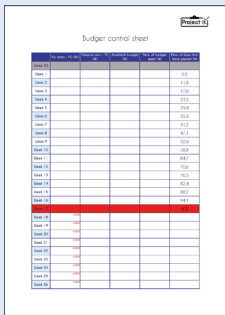
This calendar is used to keep track of the days that are passing during the project.

The green cell corresponds to the start date of the project, the red cell corresponds to the delivery date of the project and the orange cells correspond to public holidays, so that no work can be done on these days.

The days marked in red correspond to the occurrence of an event.

The small white cells inside each day are used to mark that the date has passed. The small yellow cell is used to mark the days affected by an event. Above this date you can write the name of an employee who is hired on a temporary basis, to count the number of days he/she works.

## 4. Budget control sheet



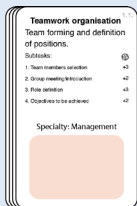
Week	Budget	Actual	Remaining	Percentage	Days passed
Week 01	50				
Week 02	110				
Week 03	170				
Week 04	230				
Week 05	290				
Week 06	350				
Week 07	410				
Week 08	470				
Week 09	530				
Week 10	590				
Week 11	650				
Week 12	710				
Week 13	770				
Week 14	830				
Week 15	890				
Week 16	950				
Week 17	1010				
Week 18	1070	3000			
Week 19	1130				
Week 20	1190				
Week 21	1250				
Week 22	1310				
Week 23	1370				
Week 24	1430				
Week 25	1490				
Week 26	1550				

This budget sheet is used to keep track of how much of the budget is being spent and must be filled in each time a week has concluded.

It is divided into 6 columns. The first one corresponds to the current week that the employees are working on. The next column refers to the amount of money that has been spent on permanent contracts, which means the weekly salary of the whole team. The next one is for adding the sum of money spent on the temporal employees during that week. The fourth column is for keeping track on how much of the budget is remaining, and the following one refers to the percentage of it that has been spent. The last column counts the percentage of days that passed until the project delivery date.

As it is shown on the sheet, on the second column starting on week 18, the team will have a penalty of 3000€ each week the team is delayed with the project.

## 5. Task cards



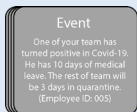
These cards correspond to the tasks. There are a total of 22 tasks distributed in 5 milestones. Each task shows at the top right the number of the milestone to which it corresponds and its task order within the milestone. It also displays a brief description of the task and the subtasks that the worker will have to perform. To the right of it there is a number that corresponds to the result that must come up when rolling the dice to complete each subtask. There is also a slot where the worker must be placed, who must have the specialty mentioned above this slot.

## 6. Employee cards



These cards correspond to employees (total of 23). On each card you can see what each employee does or has studied in addition to his/her specialty. Below the specialty, a characteristic related to the performance in each subtask is shown, which will be related with their salary. There is also a cell where the player will have to write the ID of the employee (001, 002, etc.). At the bottom right it displays the daily rate that it would cost to hire him if he/she was hired on a temporary basis, and then the weekly salary for those employees that are hired permanently.

## 7. Event cards



Event cards correspond to occurrences that may occur during the course of the game. Some of them affect tasks, some affect certain employees, some affect the whole team, and some do not contain any occurrences at all. There is a total of 21 event cards.

## 8. Dice



Simple dice which must be thrown to complete subtasks from each task



# Game instructions

## Introduction

The goal of the game is to remain with the highest quantity of the initial budget. This means that the players will have to make good decisions in task planning and employee designation to finish the project on time.

It is recommended to play the game in groups of 3 to 4 players, where each person can be responsible for one function (e.g. one rolls the dice and moves the tasks, another fills in the calendar and another fills in the budget sheet).

During the game, the players will have to choose between a handful of employees with different salaries, characteristics, and specialties, and designate them to the different tasks. These tasks are divided into 5 milestones and contain certain subtasks that must be accomplished. Therefore, to complete a task, all its subtasks must be done. And to get a subtask done, it will be necessary to roll the dice and obtain the same or a higher number that corresponds to the subtask. This number can vary depending on the employee.

They will have to follow a calendar in which some days they will encounter events that will force them to change their strategy.

## Game flow

1. First, the players will have to read the project description to have an idea on what the project consists of and obtain relevant information about. (2 minutes)

2. Next, the players must choose 5 employees from among all of them who will work on the project. Things to consider:

a. *Specialty* - Employees may only work on those tasks that match their specialty. Some employees count with more than one specialty, meaning they will be able to work on more than one type of task.

b. *Weekly Salary* - The money that you will spend each week by having him/her on the team.

c. *Daily rate* - Money that costs each employee if you decide to hire him/her temporarily. They can be hired at any time during the project.

d. *(-1 in subtasks)* - This means that this employee can accomplish the subtasks by getting one number less when rolling the dice in each subtask.

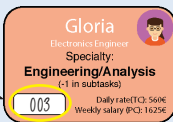
e. *(+1 in subtasks)* - This means that this employee can accomplish the subtasks by getting one number more when rolling the dice in each subtask.

f. Those employees that have no information below the *Specialty* will have to obtain the number it shows or higher on each subtask.

It is important to ensure that the team is multidisciplinary and that salaries do not exceed the budget. Throughout the game you will be able to hire temporarily an employee paying their corresponding daily rate. Writing down and calculating the salaries can help during the game. **In addition, the work team must be composed of at least one employee with a specialisation in management, as he/she will be the project manager.** (5 minutes)

3. Players must write down the employee ID in the white cells. the purpose of the IDs is related to the events that may occur, since some of them will only affect certain employees of the team. It doesn't matter what ID is assigned to each employee. These numbers must go from 001 to 005 as it is shown in the example below. (1 minute)

Employee ID →

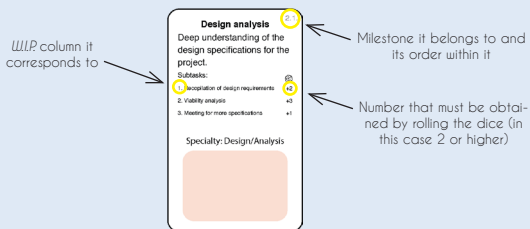


The image shows an employee card for Gloria. The card is orange and rounded. It contains the following information: Name: Gloria; Title: Electronics Engineer; Specialty: Engineering/Analysis (-1 in subtasks); Daily rate (TC): 560€; Weekly salary (PC): 1625€. A yellow box highlights the Employee ID '003' in the bottom left corner. An arrow points from the text 'Employee ID' to this box. There is also a small circular icon of a person's face in the top right corner of the card.

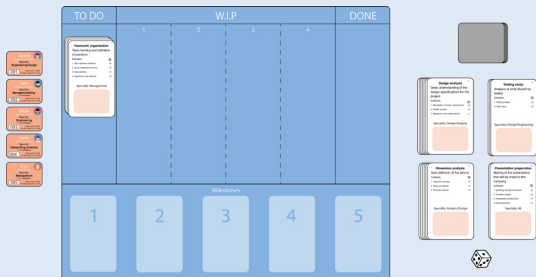
4. Once the employees are chosen, the players can get the task cards and organise them. Each task card contains a number that is shown on the top right part of the card, and it corresponds to the milestone to which it belongs and its order within it.

The card also shows its title with a brief description about the task. The subtasks are displayed below the description, and on the right part of each subtask there is a number that corresponds to the number that the player must obtain to accomplish the respective subtask. In addition, each subtask has a column in the *W.I.P.* part of the Kanban Board it belongs to.

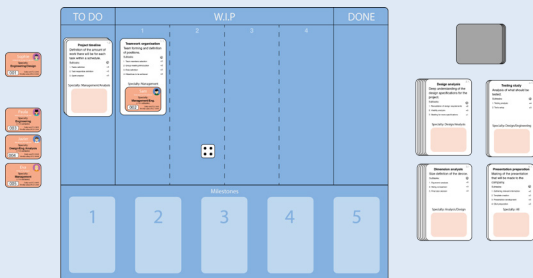
As it has been mentioned before, each task can have one or more specialties, which means that the tasks can only be completed by an employee that matches with one of them. Employees must be placed on the cell below the specialty while it is being worked on. (4 minutes)



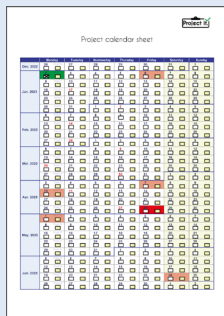
5. From this point the players will play by their own. Once the cards are organized, the game can start. First, the tasks cards from the first milestone must be placed on the *To do* column in the Kanban Board, as it is shown below. The rest of the task's cards can be placed on the side. You can also place the chosen employees on the side of the board. The event cards must be also placed next to the board and turned upside down.



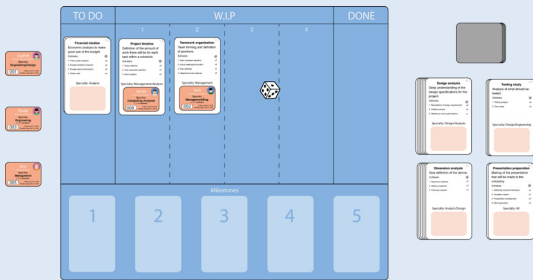
Once they are all placed on the *To do* column the first task should have to be placed on the first column on the *W.I.P* part of the Kanban Board.



Then, the players will have to roll the dice. If the number obtained on the dice is the same number or higher than the corresponding number, the subtask will be completed, and the card can be moved to column number 2. If not, it will have to stay on the same column. Once the dice is rolled, the player must mark on the calendar that the day has passed. Players can only roll the dice once per day and task, meaning that if there is more than one task on the board, the dice must be rolled once per task, and that will mean that a day has passed.



Once the day has been marked on the calendar sheet, the game can continue. As it has been mentioned before, if the number that has been obtained by rolling the dice is lower than the one mentioned in the subtask, the task must stay in the column. If it is equal or higher, the task can be moved to the next column to start working on the next subtask. As the first column has been freed, the next task in order can be moved to this column. The image below represents as if the number obtained with the dice is higher than the one that the first subtask from the first tasks, so it has been moved to the next column and a new task has been added to the first column.



Once both tasks are correctly placed, the next day on the calendar must be marked and the dice can be rolled out to start the second subtask from the first task. If the obtained number is equal or higher, this task can be moved to the third column. The dice must be thrown again for the first subtask of the second task, and it will be moved or not depending on the result.

This must be repeated until all the tasks from the first milestone reach the *Done* column. Once this happens, the cards must be put on the bottom part of the board on its corresponding milestone.

It is important to keep track on the days passed on the calendar sheet and fill in the budget sheet as it is shown in the next page. Players must take care that the column for the percentage of the budget spent does not exceed the percentage of days that have passed.

Budget control sheet

Task	Start	End	Duration	Cost	Resources
Task 1	1/1/20	1/1/20	1	10000	1, 2
Task 2	1/1/20	1/1/20	1	10000	1, 3
Task 3	1/1/20	1/1/20	1	10000	1, 4
Task 4	1/1/20	1/1/20	1	10000	1, 5
Task 5	1/1/20	1/1/20	1	10000	1, 6
Task 6	1/1/20	1/1/20	1	10000	1, 7
Task 7	1/1/20	1/1/20	1	10000	1, 8
Task 8	1/1/20	1/1/20	1	10000	1, 9
Task 9	1/1/20	1/1/20	1	10000	1, 10
Task 10	1/1/20	1/1/20	1	10000	1, 11
Task 11	1/1/20	1/1/20	1	10000	1, 12
Task 12	1/1/20	1/1/20	1	10000	1, 13
Task 13	1/1/20	1/1/20	1	10000	1, 14
Task 14	1/1/20	1/1/20	1	10000	1, 15
Task 15	1/1/20	1/1/20	1	10000	1, 16
Task 16	1/1/20	1/1/20	1	10000	1, 17
Task 17	1/1/20	1/1/20	1	10000	1, 18
Task 18	1/1/20	1/1/20	1	10000	1, 19
Task 19	1/1/20	1/1/20	1	10000	1, 20
Task 20	1/1/20	1/1/20	1	10000	1, 21
Task 21	1/1/20	1/1/20	1	10000	1, 22
Task 22	1/1/20	1/1/20	1	10000	1, 23
Task 23	1/1/20	1/1/20	1	10000	1, 24
Task 24	1/1/20	1/1/20	1	10000	1, 25
Task 25	1/1/20	1/1/20	1	10000	1, 26
Task 26	1/1/20	1/1/20	1	10000	1, 27
Task 27	1/1/20	1/1/20	1	10000	1, 28
Task 28	1/1/20	1/1/20	1	10000	1, 29
Task 29	1/1/20	1/1/20	1	10000	1, 30
Task 30	1/1/20	1/1/20	1	10000	1, 31

As mentioned before, there are certain days on which events occur. These days are those that are coloured in red on the calendar sheet (e.g. 17 January). So, when the current date is one of these days, one of the event cards should be taken before rolling the dice. The occurrences that appear on the cards start on that same day, meaning that, for example, if it happens that a worker cannot work for the next 5 days, the first day he/she cannot work is that same day. Another thing that can happen is that an employee leaves the team. If this happens, another employee can be recruited to fill the position.

The following represents what the game should look like when all tasks are completed.

The image shows a Kanban board for project management. The board is divided into three main columns: 'TO DO', 'W.I.P.' (Work In Progress), and 'DONE'. The 'W.I.P.' column is further divided into four sub-columns labeled 1, 2, 3, and 4. To the left of the board, there are several task cards, each with a title, a description, and a list of resources. To the right of the board, there are several event cards, each with a title, a description, and a list of resources. A dice and a grey card are also visible on the board.

As it can be seen on the image from the previous page, the employees from the team are placed on the left part of the board and on top those employees that have been hired temporarily or that have left the team. On the right-hand side of the table, the event cards that have been released during the project are displayed. There is a total of 9 since there are 9 dates involving occurrences. In addition, the task cards are placed on their respective milestones.

Below is what the budget and calendar sheets could look like at the end of the project.

Project calendar sheet

Week	Day	Task/Event
Week 1	Mon	Task 1
Week 1	Tue	Task 1
Week 1	Wed	Task 1
Week 1	Thu	Task 1
Week 1	Fri	Task 1
Week 1	Sat	Task 1
Week 1	Sun	Task 1
Week 2	Mon	Task 1
Week 2	Tue	Task 1
Week 2	Wed	Task 1
Week 2	Thu	Task 1
Week 2	Fri	Task 1
Week 2	Sat	Task 1
Week 2	Sun	Task 1
Week 3	Mon	Task 1
Week 3	Tue	Task 1
Week 3	Wed	Task 1
Week 3	Thu	Task 1
Week 3	Fri	Task 1
Week 3	Sat	Task 1
Week 3	Sun	Task 1
Week 4	Mon	Task 1
Week 4	Tue	Task 1
Week 4	Wed	Task 1
Week 4	Thu	Task 1
Week 4	Fri	Task 1
Week 4	Sat	Task 1
Week 4	Sun	Task 1
Week 5	Mon	Task 1
Week 5	Tue	Task 1
Week 5	Wed	Task 1
Week 5	Thu	Task 1
Week 5	Fri	Task 1
Week 5	Sat	Task 1
Week 5	Sun	Task 1
Week 6	Mon	Task 1
Week 6	Tue	Task 1
Week 6	Wed	Task 1
Week 6	Thu	Task 1
Week 6	Fri	Task 1
Week 6	Sat	Task 1
Week 6	Sun	Task 1
Week 7	Mon	Task 1
Week 7	Tue	Task 1
Week 7	Wed	Task 1
Week 7	Thu	Task 1
Week 7	Fri	Task 1
Week 7	Sat	Task 1
Week 7	Sun	Task 1
Week 8	Mon	Task 1
Week 8	Tue	Task 1
Week 8	Wed	Task 1
Week 8	Thu	Task 1
Week 8	Fri	Task 1
Week 8	Sat	Task 1
Week 8	Sun	Task 1
Week 9	Mon	Task 1
Week 9	Tue	Task 1
Week 9	Wed	Task 1
Week 9	Thu	Task 1
Week 9	Fri	Task 1
Week 9	Sat	Task 1
Week 9	Sun	Task 1

Budget control sheet

Item	Value	Unit	Cost	Revenue	Profit
Item 1	1000	€	100000	4.87	5.9
Item 2	1500	€	150000	9.75	11.8
Item 3	2000	€	200000	19.5	23.6
Item 4	2500	€	250000	39.0	47.2
Item 5	3000	€	300000	78.0	94.4
Item 6	3500	€	350000	117.0	141.6
Item 7	4000	€	400000	156.0	188.8
Item 8	4500	€	450000	195.0	236.0
Item 9	5000	€	500000	234.0	283.2
Item 10	5500	€	550000	273.0	330.4
Item 11	6000	€	600000	312.0	377.6
Item 12	6500	€	650000	351.0	424.8
Item 13	7000	€	700000	390.0	472.0
Item 14	7500	€	750000	429.0	519.2
Item 15	8000	€	800000	468.0	566.4
Item 16	8500	€	850000	507.0	613.6
Item 17	9000	€	900000	546.0	660.8
Item 18	9500	€	950000	585.0	708.0
Item 19	10000	€	1000000	624.0	755.2
Item 20	10500	€	1050000	663.0	802.4
Item 21	11000	€	1100000	702.0	849.6
Item 22	11500	€	1150000	741.0	896.8
Item 23	12000	€	1200000	780.0	944.0
Item 24	12500	€	1250000	819.0	991.2
Item 25	13000	€	1300000	858.0	1038.4
Item 26	13500	€	1350000	897.0	1085.6
Item 27	14000	€	1400000	936.0	1132.8
Item 28	14500	€	1450000	975.0	1180.0
Item 29	15000	€	1500000	1014.0	1227.2
Item 30	15500	€	1550000	1053.0	1274.4
Item 31	16000	€	1600000	1092.0	1321.6
Item 32	16500	€	1650000	1131.0	1368.8
Item 33	17000	€	1700000	1170.0	1416.0
Item 34	17500	€	1750000	1209.0	1463.2
Item 35	18000	€	1800000	1248.0	1510.4
Item 36	18500	€	1850000	1287.0	1557.6
Item 37	19000	€	1900000	1326.0	1604.8
Item 38	19500	€	1950000	1365.0	1652.0
Item 39	20000	€	2000000	1404.0	1699.2
Item 40	20500	€	2050000	1443.0	1746.4
Item 41	21000	€	2100000	1482.0	1793.6
Item 42	21500	€	2150000	1521.0	1840.8
Item 43	22000	€	2200000	1560.0	1888.0
Item 44	22500	€	2250000	1599.0	1935.2
Item 45	23000	€	2300000	1638.0	1982.4
Item 46	23500	€	2350000	1677.0	2029.6
Item 47	24000	€	2400000	1716.0	2076.8
Item 48	24500	€	2450000	1755.0	2124.0
Item 49	25000	€	2500000	1794.0	2171.2
Item 50	25500	€	2550000	1833.0	2218.4
Item 51	26000	€	2600000	1872.0	2265.6
Item 52	26500	€	2650000	1911.0	2312.8
Item 53	27000	€	2700000	1950.0	2360.0
Item 54	27500	€	2750000	1989.0	2407.2
Item 55	28000	€	2800000	2028.0	2454.4
Item 56	28500	€	2850000	2067.0	2501.6
Item 57	29000	€	2900000	2106.0	2548.8
Item 58	29500	€	2950000	2145.0	2596.0
Item 59	30000	€	3000000	2184.0	2643.2
Item 60	30500	€	3050000	2223.0	2690.4
Item 61	31000	€	3100000	2262.0	2737.6
Item 62	31500	€	3150000	2301.0	2784.8
Item 63	32000	€	3200000	2340.0	2832.0
Item 64	32500	€	3250000	2379.0	2879.2
Item 65	33000	€	3300000	2418.0	2926.4
Item 66	33500	€	3350000	2457.0	2973.6
Item 67	34000	€	3400000	2496.0	3020.8
Item 68	34500	€	3450000	2535.0	3068.0
Item 69	35000	€	3500000	2574.0	3115.2
Item 70	35500	€	3550000	2613.0	3162.4
Item 71	36000	€	3600000	2652.0	3209.6
Item 72	36500	€	3650000	2691.0	3256.8
Item 73	37000	€	3700000	2730.0	3304.0
Item 74	37500	€	3750000	2769.0	3351.2
Item 75	38000	€	3800000	2808.0	3398.4
Item 76	38500	€	3850000	2847.0	3445.6
Item 77	39000	€	3900000	2886.0	3492.8
Item 78	39500	€	3950000	2925.0	3540.0
Item 79	40000	€	4000000	2964.0	3587.2
Item 80	40500	€	4050000	3003.0	3634.4
Item 81	41000	€	4100000	3042.0	3681.6
Item 82	41500	€	4150000	3081.0	3728.8
Item 83	42000	€	4200000	3120.0	3776.0
Item 84	42500	€	4250000	3159.0	3823.2
Item 85	43000	€	4300000	3198.0	3870.4
Item 86	43500	€	4350000	3237.0	3917.6
Item 87	44000	€	4400000	3276.0	3964.8
Item 88	44500	€	4450000	3315.0	4012.0
Item 89	45000	€	4500000	3354.0	4059.2
Item 90	45500	€	4550000	3393.0	4106.4
Item 91	46000	€	4600000	3432.0	4153.6
Item 92	46500	€	4650000	3471.0	4200.8
Item 93	47000	€	4700000	3510.0	4248.0
Item 94	47500	€	4750000	3549.0	4295.2
Item 95	48000	€	4800000	3588.0	4342.4
Item 96	48500	€	4850000	3627.0	4389.6
Item 97	49000	€	4900000	3666.0	4436.8
Item 98	49500	€	4950000	3705.0	4484.0
Item 99	50000	€	5000000	3744.0	4531.2
Item 100	50500	€	5050000	3783.0	4578.4

As it can be appreciated on the sheets, each day has been marked in addition to those days when events were taking place, and the budgetary content has been filled in for each week. In this example, the remaining budget has turned out to be **18940€**. This amount should be compared to the one the other teams had to see who won. The game can be repeated by using other strategies to try to improve the result.

## Compilation of points to remind

- The goal of the game is to obtain the largest amount of remaining budget.
- The work team must always be composed of 5 workers.
- An employee can be changed only if an event states it.
- Employees can be changed between tasks.
- Employees can be hired temporarily (TC) at any time.
- The start date of any event is the day in which the card has been picked up.
- Some employees must get a higher or lower number when rolling the dice to complete a subtask.
- A task can be placed on the first column of the *WIP* part only if there is no other task on it.
- A task cannot overtake another, meaning that, if there are more than one task on a same column, and if the result of the dice for the corresponding subtask from the first task is not achieved, the subtasks from the other tasks cannot be performed. This cannot happen on column 1 since there can only be one task each time as it has been mentioned before.
- All the tasks from a milestone must be completed to be able to work on the tasks of the next milestone.
- The tasks of the last milestone must be performed by all employees of the team as it is stated on the card, meaning that they will only be able to work on a task at a time. The tasks can still be performed if there is an employee that is not available during the days they are being carried out.
- Tasks must be moved to the *Done* column once all its corresponding subtasks are completed. Therefore, if a task contains 1, 2 or 3 subtasks, their last column from the *WIP* part will be columns number 1, 2 and 3 respectively.



