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Tower Defense : User Manual

Symmary

I - Compilation and launch

Compilation

The project can be compiled by using : *make* to produce the executable that will be placed in the « bin » folder
Then we launch the game with : ./td [OPTIONS]

Command line and options

As said before, the project can be launch with ./td [OPTIONS] ; From here we can launch without options but it is possible to use -h or –help to get more informations and help on the terminal
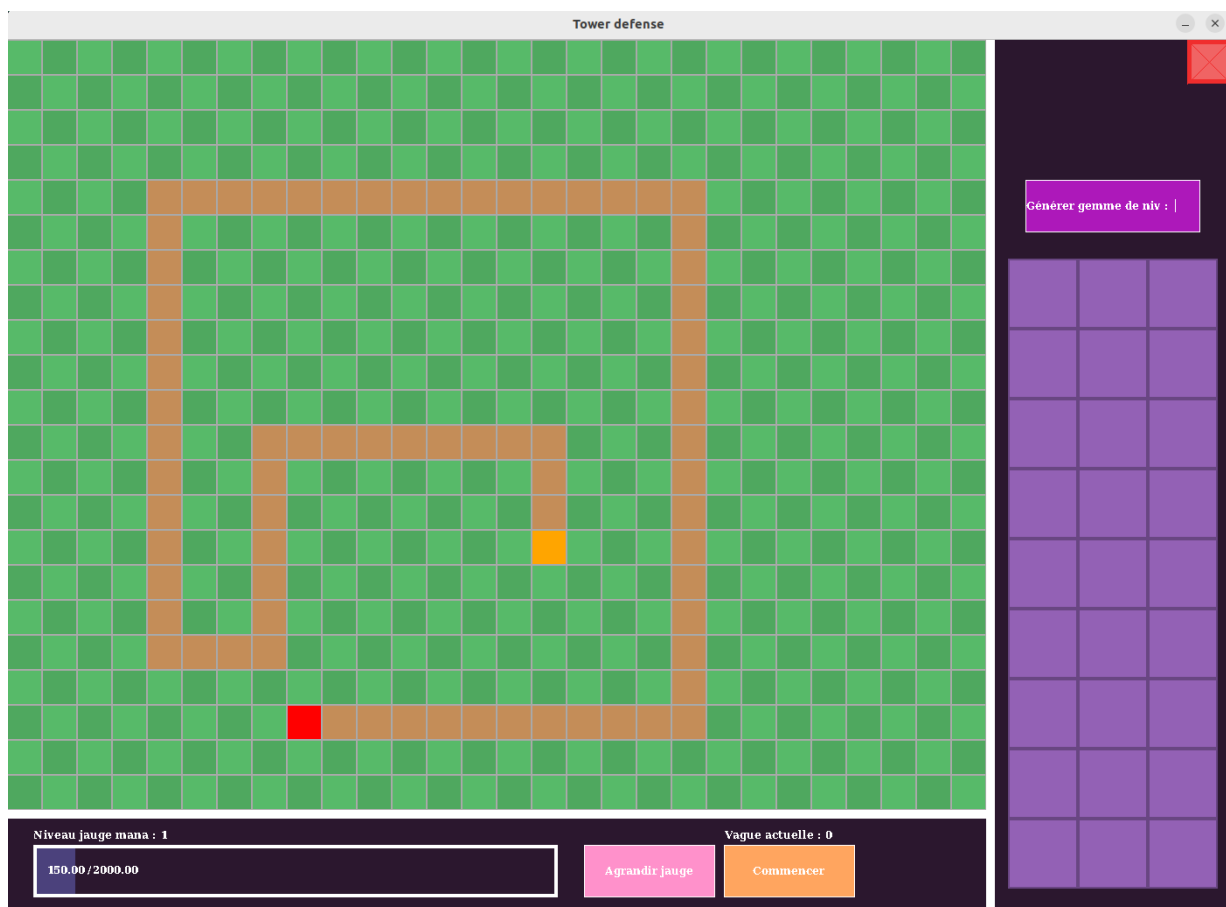
Right after using the command, the game window open.

Figure 1: Game window after using ./td

II - Game rules

Player's actions

a) In the menu

On the window we can see two zones : the terrain and the player's menu.
From this menu, the player can perform differents actions before or during the game :

- **Générer gemme de niv (Generate a gem)** : allows the player to input the level of the gem they wish to generate. After pressing Enter, the specified level of pure gem is generated. Note that at the beginning of the game, the player can only generate a level 0 gem since the cost of generating a gem is 100×2^n, and the player starts with only 150 mana. Additionally, no gems will be generated if the inventory is full, and only gems between levels 0 and 25 can be generated.

- **Inventaire (Inventory)** : this is where all the gems that are not in towers are stored. The player can drag a gem onto another to merge them (if they are of the same level) or drag gems into towers to place them or swap them with other gems already in the towers. The player can also organize the gems within the inventory.

- **Agrandir jauge (Increase gauge)** : allows the player to increase the capacity of the mana gauge (note that this is very expensive!). The maximum gauge level is capped at 200 to prevent the game from becoming too easy.

- **Commencer** / **Passer à la vague suivante (Start / Next wave)** : either starts the game by launching the first wave of monsters or moves directly to the next wave, granting a certain amount of mana based on the remaining time before the next wave. Note that waves automatically appear every 35 seconds.

- **Cross** (top right corner) : properly exit the game

b) On the terrain

The player can also perform actions on the terrain :

- **Poser une tour (Place a tower)** : by clicking on an empty tile on the field, the player can place an empty tower. The first three towers are free, but after that, the cost starts at 100 mana and doubles with each additional tower.

- **Sélectionner une tour (Select a tower)** : the player can click on a tower with a gem to select it, which will then display the tower's shooting range.

- **Poser** / **échanger les gemmes (Place / swap gems)** : as mentioned for the inventory, the player can drag gems into towers to place them. However, each time a gem is placed or swapped, it takes 2 seconds before it can start shooting.

- **Retirer une gemme (Remove a gem)** : to remove a gem, the player must first select the tower, then drag the gem out of the tower to place it back into the inventory. Note that simply dragging the gem out of the tower and releasing the click will return it to the inventory.

It is important to note that the player must first select the tower BEFORE dragging the gem out of the tower.

We also emphasize that to drag a gem, the player needs to hold down the left mouse button on the gem, and all actions are performed with the left mouse click.

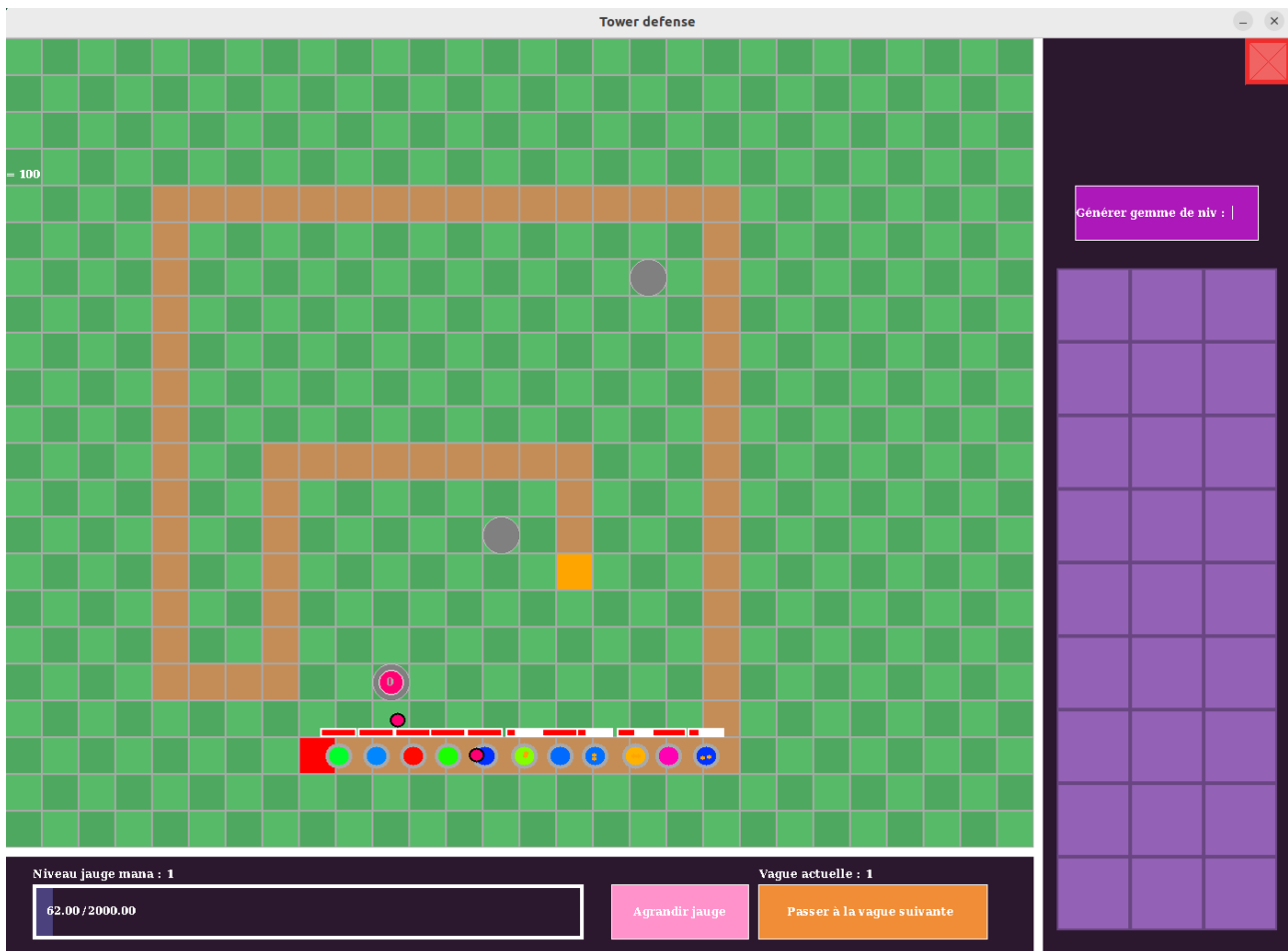The mana costs for all actions (except gem generation) are displayed under the mouse pointer.

Figure 2: A game after placing gems and launching the first wave

Game's mechanics

The objective of the game is to kill monsters coming from the **nest** to defend the **camp** using gems. There are two types of gems: pure (circles), which have elemental effects, and impure (squares), which deal more damage. Additionally, each gem has a color representing its element and a level written at the center of the gem.

Each monster and gem belong to different elements (pyro, dendro, hydro), meaning that certain gems will deal more damage to monsters with an element opposite to that of the gem. Furthermore, pure gems can inflict elemental damage or leave elemental residues on the monsters, which, when combined, can create additional effects.

The possible effects are :

- Pyro : deals 15% of the base damage to monsters within a 2-tile radius of the impact point of a shot, taking into account the element.

- Dendro : deals 2.5% of the base damage every 0.5 seconds to the monster for 10 seconds.

- Hydro : Reduces speed by 1.5x for 10 seconds.

And those with residue combinations :

- Vaporisation (pyro + hydro) : deals 5% damage to monsters within a 3.5-tile radius of the impact point and also reduces their speed by 1.25x for 5 seconds.

- Combustion (pyro + dendro) : triples the damage of the current shot.

- Rooting (dendro + hydro) : immobilizes the monster for 3 seconds.

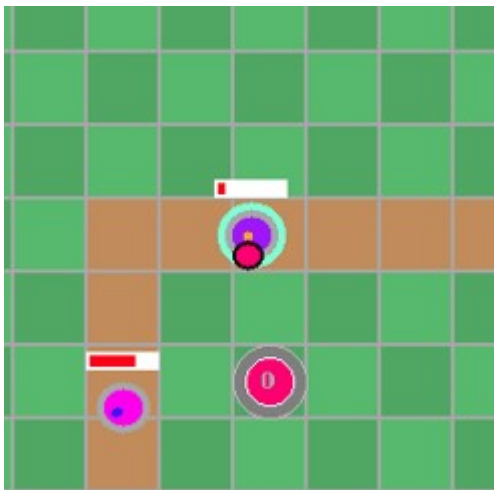Each of these effects is visible during the game on monsters hit by projectiles.

Figure 6: At the bottom : a gem with Hydro residues

At the top : a gem with the Vaporization effect activated by the projectile from a Pyro-type gem.

Figure 3: At the bottom: gems with Hydro residues.
Bottom left: a gem with the Hydro effect.

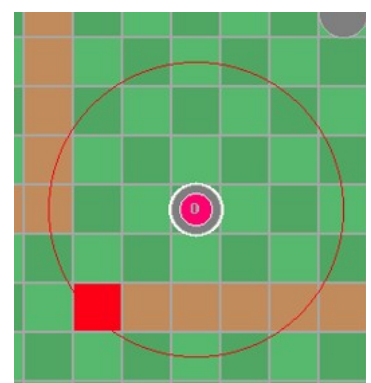*Figure 4: An impure level 1 gem and a pure level 0 gem in the inventory*

Figure 5: A tower with a gem selected

The monsters can appear in waves of four different types :

- normal : 12 monsters, speed of one tile per second

- horde: 24 monsters, speed of one tile per second

- agile : 12 monsters, speed of two tiles per second

- boss : 2 monsters, speed of one tile per second

End of game

The game ends when the player's mana reserve is empty, from here, an end screen will appear for a few seconds before the game closes.

Figure 7: Ending screen with the score