**Bots Tokenomics study**

**Simulation code:**

We have built a complete algorithm that simulates the gameplay of 4 bots. Each bot will select different missions with different lengths in a random fashion. Resources that are given per mission are fixed considering Token Guy’s numbers. Nevertheless, these numbers will be tweaked along the process to fit into our final needs. Gameplay also considers that bots run out of energy and includes a mission to recharge the bot (which accounts for gameplay time).

Our main goal is to fine-tune emission numbers and experience numbers to have a fully levelled up bot **within 6-8 months of playtime**. To do so, we will start simulating the gameplay to set the experience thresholds for leveling. Then we will use a Montecarlo simulation to close in the exact emission values per mission.

**Fixed assumptions:**

Resources have the following importance: plastic>metal>silicon thus making plastic the most common resource and silicon the scarcest. From here, we assume that leveling rarity will always require the following ratios. 3:2:1 (plastic/metal/silicon). Bit cost will be simulated.

Recharge times will always be **40 energy/hour**.

Missions XP & Energy

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Energy Cost / hour** | **XP on mission Success** | **XP on mission Fail** |
| **Plastic** | 2 | 30 | 9 |
| **Metal** | 3 | 40 | 12 |
| **Silicon** | 4 | 50 | 15 |

Based on this fixed numbers we have run 1000 simulations of 500 missions each to get a precise number of obtained experience per hour

**Table 1**. Numbers obtained from 1 random simulation (500 missions per bot)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Bot Name** | **Simulation Number** | **Total Game Time (Hours)** | **XP Earned** | **Average XP/hour** |
| **Bot 1** | 74 | 2.058,5 | 52.720 | 25,61 |
| **Bot 2** | 74 | 2.039,6 | 49.936 | 24,48 |
| **Bot 3** | 74 | 2.101,3 | 56.272 | 26,78 |
| **Bot 4** | 74 | 2.109,8 | 51.696 | 24,50 |

Please find all simulations on the attached document *xp\_final\_results\_1000\_runs.csv*. Having run the numbers, we calculated the average experience per hour. This number is 24,8. Below we show the distribution of the experience earned per hour for all simulations. As you can see the standard deviation of the simulation is less than 1, so we are confident that the obtained number sets a solid base to keep building the leveling experience.

Gráfico, Gráfico de cajas y bigotes

Descripción generada automáticamente

With the exact experience per hour accurately calculated, we can establish the maximum XP that a bot can achieve over a period of 6 to 8 months, which lies within the range of 107.136 to 142.848. Understanding the maximum achievable experience allows us to design a leveling curve that accelerates quickly at the early levels and then gradually slows down in its progression. In the table below, you’ll find the leveling progression throughout all the leveling steps.

**Table 2.** Leveling progression and expected reaching time.

|  |  |  |  |
| --- | --- | --- | --- |
| **Level** | **Required XP** | **Accumulative XP** | **Expected**  **Time (hours)** |
| Level 1 | 0 | 0 | 0,0 |
| Level 2 | 300 | 300 | 12,1 |
| Level 3 | 600 | 900 | 24,2 |
| Level 4 | 900 | 1800 | 36,3 |
| Level 5 | 1400 | 3200 | 56,5 |
| Level 6 | 1025 | 4225 | 41,3 |
| Level 7 | 1095 | 5320 | 44,2 |
| Level 8 | 1175 | 6495 | 47,4 |
| Level 9 | 1280 | 7775 | 51,6 |
| Level 10 | 1410 | 9185 | 56,9 |
| Level 11 | 1580 | 10765 | 63,7 |
| Level 12 | 1780 | 12545 | 71,8 |
| Level 13 | 2030 | 14575 | 81,9 |
| Level 14 | 2350 | 16925 | 94,8 |
| Level 15 | 2740 | 19665 | 110,5 |
| Level 16 | 3240 | 22905 | 130,6 |
| Level 17 | 3875 | 26780 | 156,3 |
| Level 18 | 4675 | 31455 | 188,5 |
| Level 19 | 5710 | 37165 | 230,2 |
| Level 20 | 7050 | 44215 | 284,3 |
| Level 21 | 8790 | 53005 | 354,4 |
| Level 22 | 11085 | 64090 | 447,0 |
| Level 23 | 14115 | 78205 | 569,2 |
| Level 24 | 18165 | 96370 | 732,5 |
| Level 25 | 23630 | 120000 | 952,8 |

And below we show the leveling curve throughout the different levels.

Gráfico, Gráfico de líneas

Descripción generada automáticamente