My little Workshop empire- a text-based economy simulator

Test for Programming Applicants

Introduction

One of your colleagues already started the implementation of the game and you will now take over the development.

The colleague mentioned that the code is not finished yet and includes some issues. Your task is to read the Game Design description below carefully to implement the missing functionality as well as finding and fixing the issues.

The decisive factor, beside the correct implementation of the Game Design is correct error handling, efficiency, and readability. The solution should compile with Visual Studio 2019 and should come with a document, describing in detail the issues you found and the way you fixed them.

You are free to change the existing code as much as you like, as long as the implementation requirements are satisfied.

At the end of the document you'll find a set of Additional Goals. If you are applying for a Junior Position, these Goals are optional for you. Otherwise it's mandatory to pick and implement at least one Goal.

Good luck!

Game Design description:

The Player starts with his first Workshop and a basic set of Tools (Jack, Torque brace, Hammer).

In the world, different types of Vehicles exist. Each Vehicle can have a set of typical Malfunctions. If a Vehicle has a Malfunction it needs to go to a Workshop.

The combination of Vehicle and Malfunction is called a Job.

The Player can choose a Job out of a list of 10 random generated Jobs.

To successfully finish a Job, the Player needs a specific set of Tools accordingly to the Malfunction.

With a finished Job the Player will earn some Money.

A Job can also fail, in case the Player has not the correct set of Tools. The Player won't get Money for failed Jobs.

There is a 50% change that the Tool, used for a Job receives some damage. Each Tool has a damage/wear counter of 5. If the counter is down to zero, the Tool can't be used for a Job anymore and needs to be replaced by a new one.

In the Hardware Shop the Player can buy new Tools for a certain amount of Money.

The Gameloop: Finish Jobs to gain Money > Buy new Tools in the Shop > Use Tools to work on Jobs

User Interface/Actions:

The game is text-based. The Player must type commands in the console to accomplish an action.

When starting the game, a little intro text is displayed to welcome the Player.

The Player can choose between these actions:

- 'i' Inventory: Current amount of Money the Player has and a list of the Tools with damage counter.
- 'j' Jobs: a list of all available Jobs with an index, type of Vehicle, the Malfunction and the required set of Tools needed to finish the Job as well as the amount of Money the player could earn by this Job.
- 'a[index]' Accept a Job: try to finish a Job using the index of the Job list. Example: 'a2' to accept the Job at index 2.
  Result of this action: "Job succeeded" or "failed" is displayed as well as the new damage counter for the used Tools.
- 's' Shop: a list of all Tools with an index and the costs. If the Player has not enough Money to buy the Tool it's visualized by the text color.
- 'b[index]' Buy Tool: If the Player has enough Money the Tool will be added to the Inventory (or damage counter adjusted if it's already in the Inventory). Money gets reduced by the price of the Tool.
  Result of this action: Damage counter for the bought Tool as well as the current amount of Money.
- 'h' Help: a list of all actions including 'x' to quit the game.

Balancing:

Type of Vehicle and Malfunctions

Vehicle	Malfunction #1	#2	#3	#4
Motorcycle	Flat tire	Empty Battery	Lights off	
Compact car	Shock Absorber broken	Engine failure	Defect spark plugs	Empty Battery
Racing car	Gas pedal broken	Engine failure	Bald tire	Bumper damaged

Malfunctions and required Tools

Malfunction	Tool #1	#2	#3	Reward
Bald tire	Jack	Torque brace		18$
Shock Absorber broken	Hammer	Screwdriver	Torque brace	14$
Empty Battery	Jumper Cables	Phase tester		6$
Bumper damaged	Hammer	Screwdriver		6$
Lights off	Phase tester			2$
Gas pedal broken	Screwdriver	Torque brace		10$
Flat tire	Jack	Torque brace		18$
Engine failure	Screwdriver	Torque brace		10$
Defect spark plugs	Phase tester	Screwdriver		4$

Tool costs

Tool	Cost
Jack	50$
Hammer	20$
Jumper Cables	20$
Phase tester	10$
Screwdriver	10$
Torque brace	40$

Additional Goal:

Please provide a document, describing why you picked that specific Goal and what kind of changes you did to achieve it.

- *The Creative Goal*: Add the option to buy additional Workshops. Each Workshop should come with a new set of Vehicles, Malfunctions and Tools.
- *The Visual Goal*: Create a non-console application solution and add a nice user interface to display the Job list, Inventory, Shop and Money. (Focus on usability rather than nice graphics)
- *The Functional Goal*: Add a Save and Load function. The player should be able to save or load a game at any point or to just start a New Game. Think about an efficient, flexible and maintainable Data structure.
- *The Quality Goal*: Create an Autotest that checks any parts of the game. Use a macro e.g. "AUTOTEST" to define either the Autotest or the Game should start.