
SIMPLE CHANGE - PROGRAMMING FLEXIBILITY

REQUIREMENT ALPAH



PURPOSE

The purpose is to introduce the students to designing flexible programs.

“Definition: Flexibility

The capability of the software product to support added/enhanced functionality purely by adding software units and specifically not by modifying existing software units.”

(page 35, Christensen 2010)

Designing flexible programs can be done in many ways, but The Compositional Design Principles as described in Christensen 2010 is used in this here. After this exercise students should be able to understand and use software patterns that is based on these principles:

“Principles for Flexible Design:

- 1) Program to an interface, not an implementation.
- 2) Favor object composition over class inheritance.
- 3) Consider what should vary in your design.”

(page 247, Christensen, 2010)

EXERCISE GOAL

You must develop a program where the *price strategy* is easy to change. The program must be flexible with regards to *this* particular feature.

PROGRAM GOAL

It is a mafia-style game where the player has 20 days to buy and sell drugs in different countries. The score is how much money the player has left at the end of the game. The game saves a high score track simply shows all the scores ever made in the game.

USER STORY

Peter The Gangster starts the game with 5000,- \$ in Columbia. He sees that the price of cocaine is very cheap and buys 12 packages. He then travels to Denmark and sells the cocaine for a profit. Peter travels back to Columbia and buys another 35 packages of Cocaine, however, this time the price has changed and the drug is a lot more expensive. He travels to Denmark and sells the cocaine, but here the price has also changed for the worse and Peter only makes a tiny profit.

This continues for 20 days with the price changing all the time. At the end of the game (the 20 days) Peter's drugs are all sold in his final country and his total amount of dollars are shown. This is his score. He then sees the high score list with his previous scores.

GREEN REQUIREMENTS

- The user must be able to start the game with 5000,-\$ in Denmark, the starting country.
- The following countries must exist and the player must be able to travel between them.
No more countries will be added:
 - a) Denmark
 - b) Colombia
 - c) Germany
 - d) USA
 - e) France
 - f) Afghanistan
- The following drugs must exist in all countries with a price and availability as follows::

| | | |
|------------------|--------------------|------------------------|
| 1. Cocaine: | Start price: 1200. | Start availability: 30 |
| 2. Heroin: | Start price: 1600. | Start availability: 15 |
| 3. Amphetamine: | Start price: 200. | Start availability: 50 |
| 4. Acid: | Start price: 550. | Start availability: 33 |
| 5. Angel dust: | Start price: 400. | Start availability: 60 |
| 6. Crystal Meth: | Start price: 800. | Start availability: 38 |
- The player must be able to select the amount of drugs to buy and sell in each country.
- After 20 country changes the game must end and sell all the players drugs at the current countries prices. The game must then display the players final, total amount of money. This must be saved in a high score list
- The high score list must be saved from game to game and be accessible.

STRATEGY: BASE PRICE

The **Price** must randomly change in each country following this rule:

1. Determine if the **price** will change: 65% chance.
2. If Yes, then determine if it should go up or down.
3. Modify the final price from 1% to 85%

The **Availability** must randomly change in each country following this rule:

1. Determine if the **availability** will change: 65% chance
2. If Yes, then determine if it should go up or down.
3. Modify the final **availability** from 15% to 55%

Price calculation example:

The player travels to Columbia. The program randomly determines that the final price should be negatively modified.

The computer then rolls 46% and modifies the cocaine price negatively like this:

$(1200\$ * 46)/100 = 552 \$$, and then

$1200 \$ - 552 \$ = 648 \$$

Availability calculation example:

The player then travels to Denmark. Here he the list of drugs show that there are now only 33 packages of cocaine available. Last time there were 47 packages available.

The program determines that the availability must change. It then determines that is must change negatively.

It now generates a random number between 15 – 55: 30%

The calculation is:

$(47 * 30)/100 = 14$ (rounded off) and then:

$47 - 14 = 33$ packages

YELLOW REQUIREMENTS

NEW FEATURE: LIFE

The player must be able to see his life as a percentage.

The player starts with 100%.

Buy life:

Make it possible to buy more life if he has lost some (the player goes to the hospital etc. you decide).

Write functionality for your program so that he player can buy back life up to 100%. You decide the cost.

RED REQUIREMENTS

EVENTS AND CHANCE

“Event” is something that happens to the player between countries; when the player is traveling from one country to the other and before he/she is allowed to sell or buy.

This could for instance be capture by the Custom Authorities that takes half the players drugs and some of his life. When an event happens, there is nothing the player can do; he is simply informed that “You were taken the Custom Authorities. They found half you drugs and you lost 10% health!”.

There is a small chance everytime a player travels that an event happens. Usually 5%, however, buying certain items or service will lower this chance. For instance buying High friends (=friends in high places or bribe) will lower the chance of getting caught by the Custom Authorities by 2%.

A separate ‘roll’ (or chance) must be made for each implemented event. Thus if 5 event with 5% chance each exist in the game, then there are 5 rolls of 5% chance that something will happen to the player when he/she travels! Thus it pays off to buy things that reduce ones risks.

EVENT: CUSTOM AUTHORITY

When traveling from country to country there is a small chance that the player will get caught by the Custom Authority:

Between turns there must be a **5% chance** that a player is captured the Custom Authority.

If this happens the player:

- is **injured 10%** of his life
- gets **half of all his drugs** taken!

BUY: HIGH FRIENDS

The player must be able to buy friends in high places that helps him get through customs. See this as buying the Captain of the Custom Authority, or the help of a high placed mafia boss who can help the player easier through customs.

Price: you decide

Effect: Lowers the chance of the *Custom Authority* event happening by **2%**.

Overview of events and service and items affecting the events:

| Chance | Event name | Effect | Services or items affecting the chance |
|--------|--------------------------|--|--|
| 5% | Custom Authority capture | Negative effect: Lose drugs, 10% life | High friends 2% |

EXTRA

The following requirements are NOT mandatory.

Loan money:

Let the player loan money from a loan shark. For instance the player could loan 5000\$ at 35% interest (you decide the max loan and interest rate).

The interest rate is accumulated each turn!

Secret pockets:

The player starts with a certain amount of secret pockets to carry packages of drugs (for instance 12). He can not buy more packages of drugs than his secret pockets allows.

The player can then buy a new coat or jacket with more secret pockets to carry more drugs (you decide the price).

DEFINING CONCEPTS:

Chance:

This is the chance that the event will happen for the player. This must be modified by the services or items the player has.

For instance if the player “Nice clothes” the chance that he will get captured by the Custom Authority is 1% small = 5% - 1% = 4%.

A separate ‘roll’ (or chance) must be made for each implemented event. Thus if 5 event with 5% chance each exist in the game, then there are a 25% chance that something will happen to the player when he/she travels! Thus it pays off to buy things that reduce ones risks.

Effect:

The effect on the player. There are currently only these possibilities:

- Gain or lose life
- Gain or lose money
- Gain or lose drugs
- (Gain or lose drug price (ie. The price of a drug may change))

If an event happens the player either gains something positive, like more money if he/she gets a “New minion pusher” or loses something like life and money for “Trespassing on mob territory”.

Service or items:

This concept covers ‘things’ that affects the chance of an event happening. A player own an item like a gun or has bought a service like friends in high places. Each one affect the chance that an event will happen to the player.

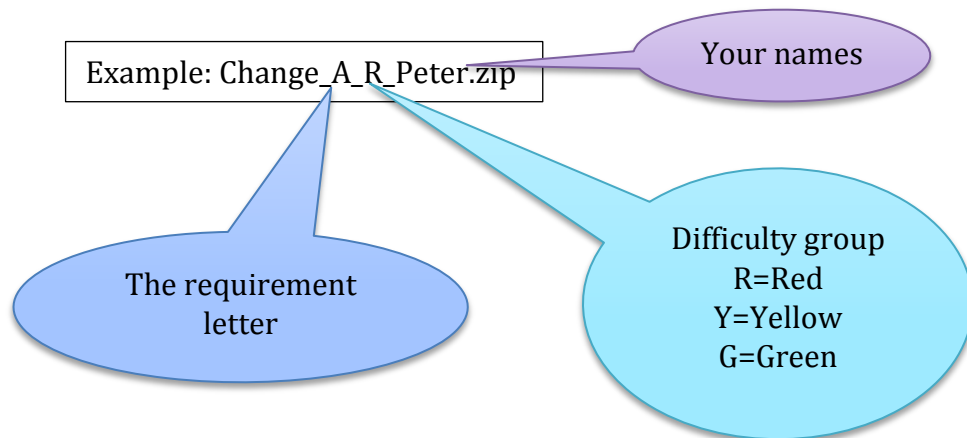
MINOR HAND-IN

1. 1 zip file, named as stated below, containing:
 - a. The code, zipped Netbeans project (=named as stated below)
 - b. A .jar file
 - c. A Design Class Diagram of your entire code

NAMING:

The name (of the zip file and the netbeans project) must be:

"Change"_ requirement letter _ difficulty group _ your name.zip



APPENDIX

PICTURES:

Front page found 18.04.2014 here: <http://footage.shutterstock.com/clip-2195911-stock-footage-abstract-background-with-molecular-structure-and-chemical-formulas.html>