C++ Fundamentals to Advanced

BSc1b: Text-Based Card Games

Niklas Henderson

Software Development Principles

Imagine you are a game developer, and have been approached to make a digital game in C++. You have been given some basic requirements… as a ‘software developer’, what should you do first?

Analyse requirements for potential classes?

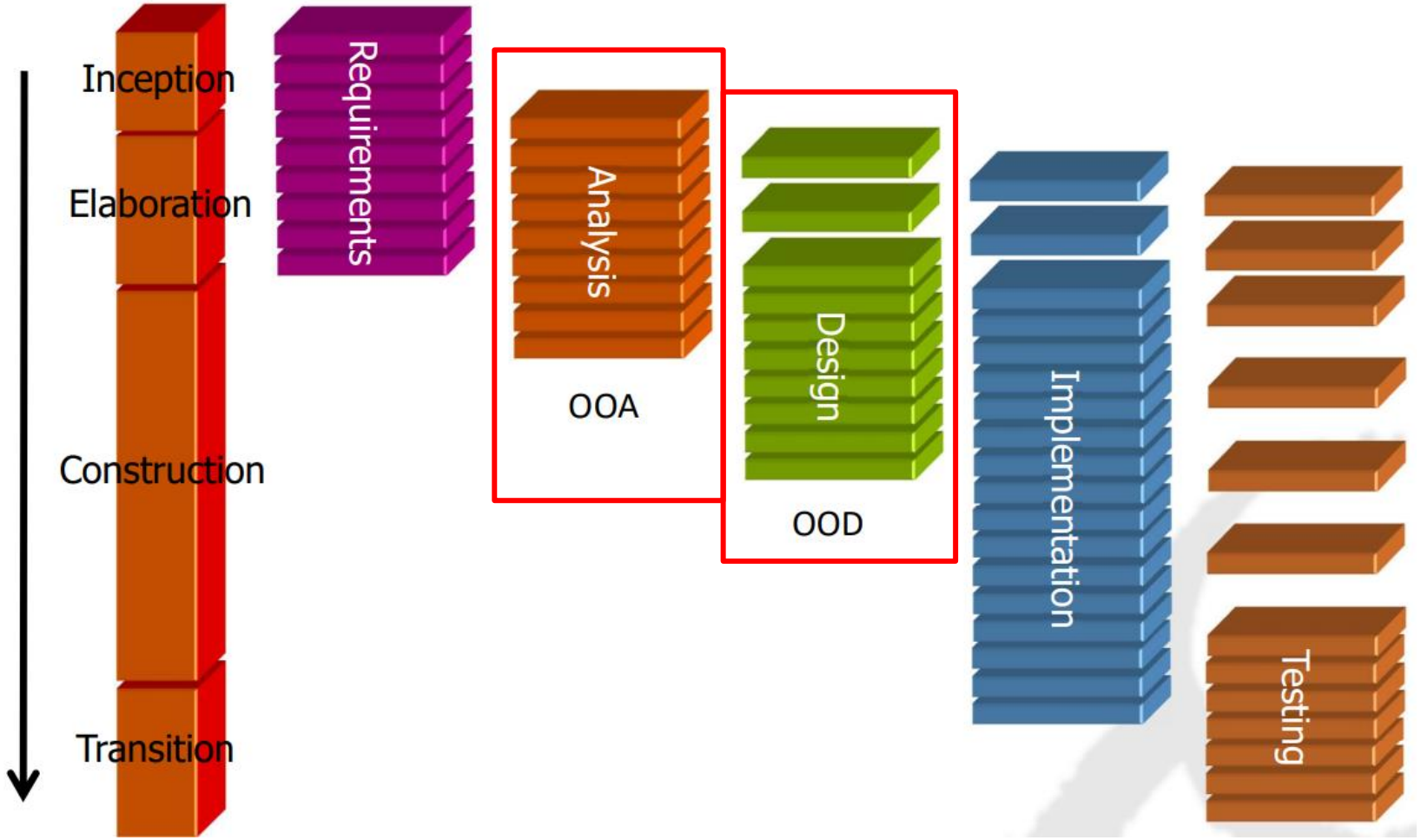
Explore and define given requirements?

Try developing some initial ideas?

Something else?

Experiment with ‘test’ classes?

Iterative and Incremental Development (IID)



OOA & OOD

OOA: Object-oriented Analysis

The main purpose of OOA is to create a high-level class hierarchy without going into the detail of implementation of these classes into programming code.

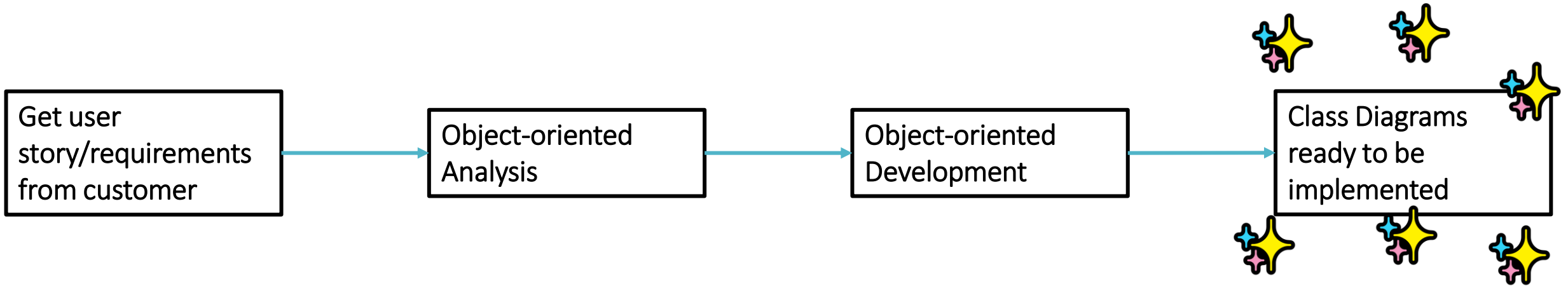
OOD: Object-oriented Development

Is developer-oriented - This step is like drawing the plans for the house before it's built. OOD takes the picture from OOA and decides how to make it real.

Object Oriented Analysis

We start by figuring out what the problem is and what we need to solve it. OOA helps us understand what different pieces are needed and how they fit together.

Classes and their corresponding objects can be identified from use cases or user stories using for example NLM (Natural Language Modelling) techniques.



1. Customer arrives at POS checkout with goods and/or services to purchase.
2. Cashier starts a new sale
3. Cashier enters item identifier.
4. System records sale line item and presents item description, price, and running total. Price calculated from a set of price rules.

Cashier repeats steps 3-4 until indicates done.

5. System presents total with taxes calculated.
6. Cashier tells Customer the total, and asks for payment.
7. Customer pays and System handles payment.
8. System logs completed sale and sends sale and payment information to the external Accounting system (for accounting and commissions) and Inventory system (to update inventory).
9. System presents receipt.
10. Customer leaves with receipt and goods (if any).

Translating Theory to Practice

Rules for Baroness Solitaire Card Game

“Five cards are dealt in a row as the bases of the five piles in the tableau. The top cards of each pile are available for removal to the discard pile. The aim is to discard all the cards by removing any Kings and pairs of available cards that total 13. In this game, spot cards are taken at face value, Jacks are worth 11, Queens 12, and Kings 13. So the following combinations of cards may be discarded: […]

When all available discards have been made, five fresh cards are dealt, one onto each pile in the tableau either filling a space or covering the existing card. The new top cards are available for play and, once again, any Kings or combinations totalling 13 are moved to the discard pile. When the top card of a pile is discarded, the card beneath becomes immediately available. Play continues in this way until there are only two cards left in hand; these are used as grace cards, being added to the end of the tableau, face up and side by side, and are available for play.”

Translating Theory to Practice

Rules for Baroness Solitaire Card Game

"Five cards are dealt in a row as the bases of the five piles in the tableau. The top cards of each pile are available for removal to the discard pile. The aim is to discard all the cards by removing any Kings and pairs of available cards that total 13. In this game, spot cards are taken at face value, Jacks are worth 11, Queens 12, and Kings 13. So the following combinations of cards may be discarded: […]

When all available discards have been made, five fresh cards are dealt, one onto each pile in the tableau either filling a space or covering the existing card. The new top cards are available for play and, once again, any Kings or combinations totalling 13 are moved to the discard pile. When the top card of a pile is discarded, the card beneath becomes immediately available. Play continues in this way until there are only two cards left in hand; these are used as grace cards, being added to the end of the tableau, face up and side by side, and are available for play."

= New Class

= Maybe a New Class

Translating Theory to Practice

Rules for Baroness Solitaire Card Game

"Five cards are dealt in a row as the bases of the five piles in the tableau. The top cards of each pile are available for removal to the discard pile. The aim is to discard all the cards by removing any Kings and pairs of available cards that total 13. In this game, spot cards are taken at face value, Jacks are worth 11, Queens 12, and Kings 13. So the following combinations of cards may be discarded: […]

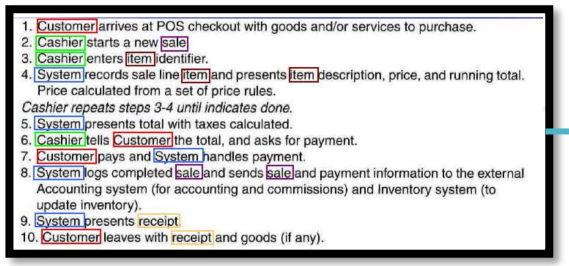
When all available discards have been made, five fresh cards are dealt, one onto each pile in the tableau either filling a space or covering the existing card. The new top cards are available for play and, once again, any Kings or combinations totalling 13 are moved to the discard pile. When the top card of a pile is discarded, the card beneath becomes immediately available. Play continues in this way until there are only two cards left in hand; these are used as grace cards, being added to the end of the tableau face up and side by side, and are available for play."

= New Class

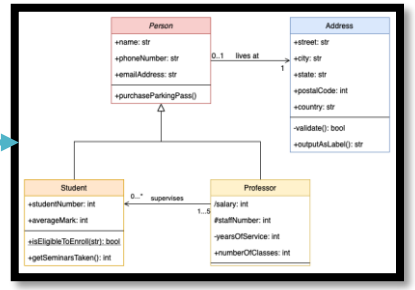
= Class Function

Object Oriented Development

OOD takes the picture from OOA and decides how to make it real. It works out how different parts of the software will talk to each other and how they'll work. OOD helps make sure everything is organized and works well together before the actual building (or coding) starts.



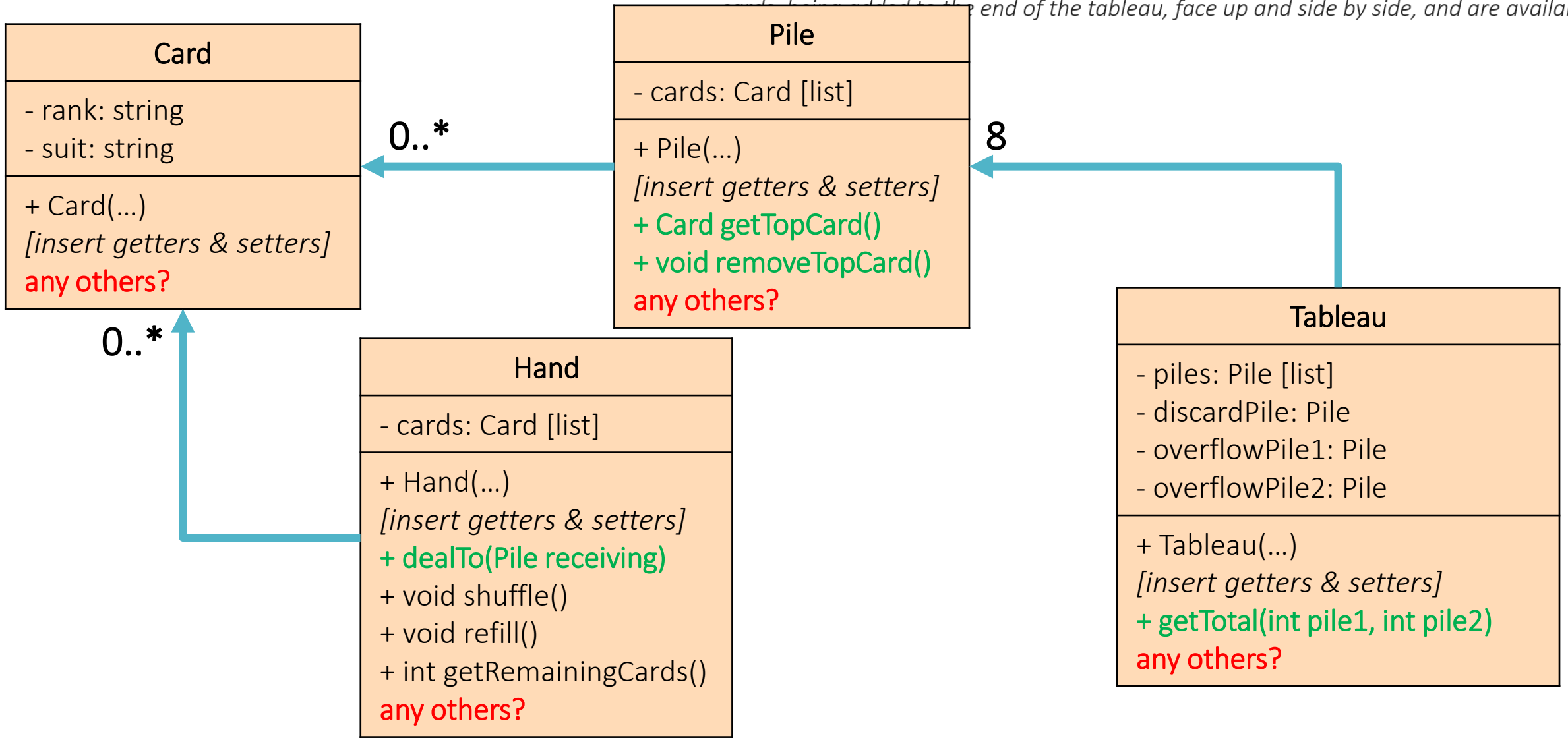
NLP OOA



OOD (Class Diagram & More)

"Five cards are dealt in a row as the bases of the five piles in the tableau. The top cards of each pile are available for removal to the discard pile. The aim is to discard all the cards by removing any Kings and pairs of available cards that total 13. In this game, spot cards are taken at face value, Jacks are worth 11, Queens 12, and Kings 13. So the following combinations of cards may be discarded: [...]

Play continues in this way until there are only two cards left in hand; these are used as grace [illegible] end of the tableau, face up and side by side, and are available for



OOA & OOD For Today

Think about your solitaire game for the second half of this project. Last week you should have decided which solitaire game to develop.

Look up some super simplified rules for your solitaire game. Can you do an NLP object-oriented analysis on it? This would be very interesting to see in your dev blogs!

This will help inform your solitaire game class diagrams. Equally as interesting for your dev blog, and should help you make a start on coding.