

Refactoring

Graeme Ludwig

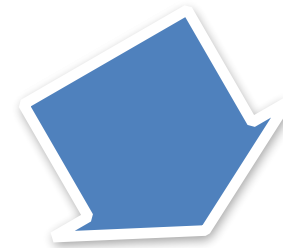
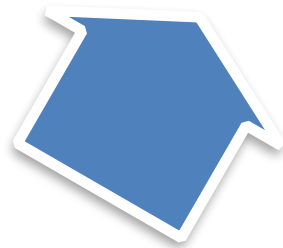
The process of changing a software system in such a way that it does not alter the **external behaviour** of the code, yet improves its **internal structure**.

Fowler, et al., Refactoring, 1999.

Test Driven Development

GREEN

Make the test work quickly.
Commit whatever sins are necessary.



RED

Write a failing test.



REFACTOR

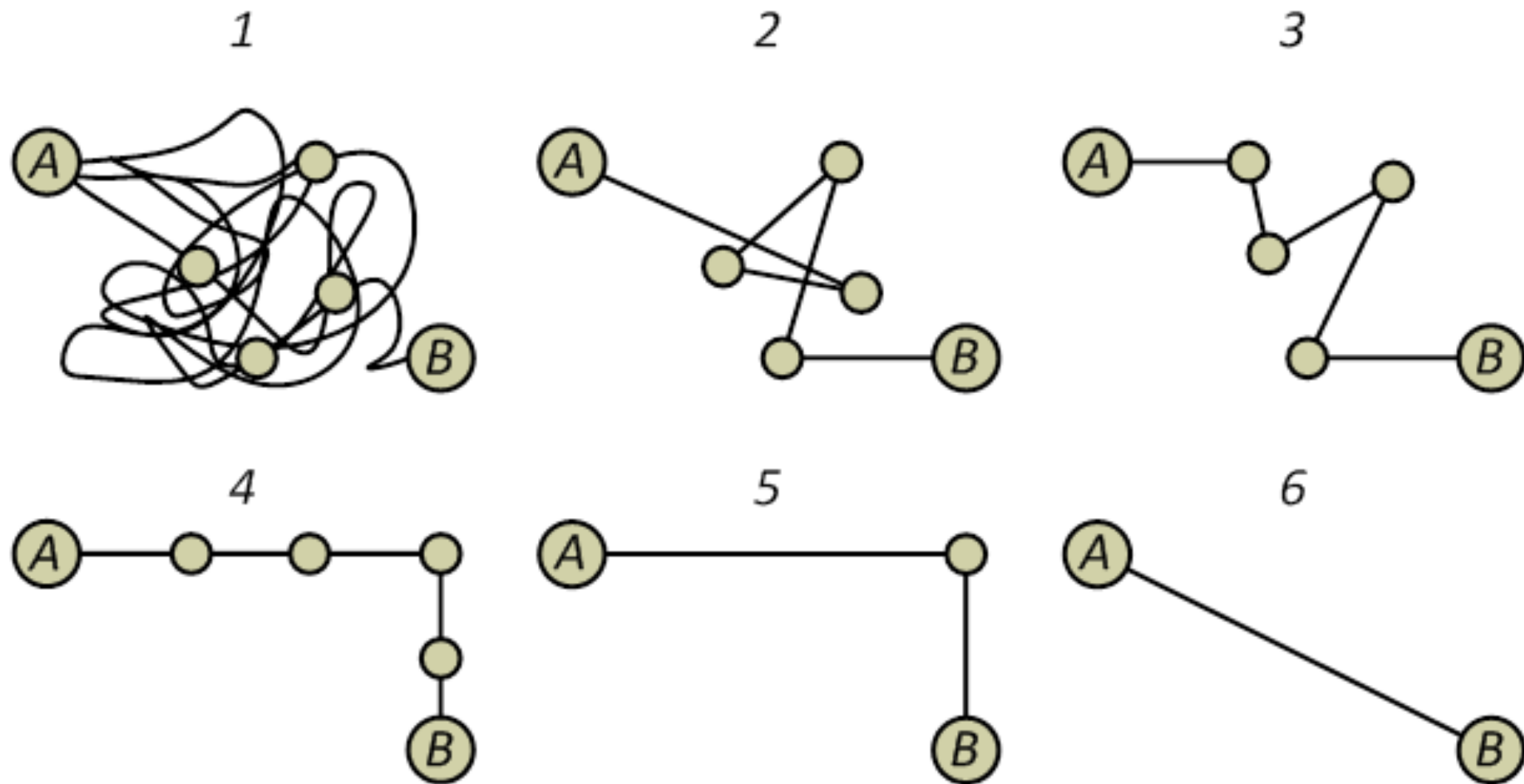
Improve the design.
Fix some/all of the sins.

Tests & Refactoring

Tests:

- Reduce fear; give us the courage to refactor.
- Prove everything still works after refactoring.
- Help us write code that is better designed.
- Help us iterate the design to keep it clean.
- Help to document features IF they are well named and well written.

Refactoring from “A” to “B”



<http://patterns.instantinterfaces.nl/current/Refactoring-and-Design-Patterns-RFCT-BAS.html#RFCT-BAS>

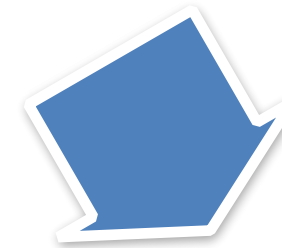
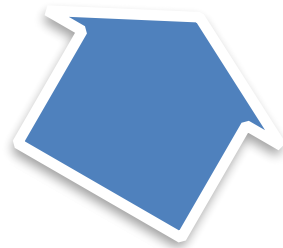
Test Driven Development

GREEN

Make the test work quickly.
Commit whatever sins are necessary.

Good tests

Automated tests



RED

Write a failing test.

REFACTOR

Improve the design.
Fix some/all of the
aforementioned sins.



Why Refactor?

Because it's hard to be “Right First Time”

- Understanding of domain improves
- User requirements change
- Original design inadequate
- System becomes brittle over time
- Saves £££'s

Who is your customer?

Refactoring: Before & After

Before refactoring...

Unreadable code	✗
Duplicated code	✗
Complex code	✗
Hard to change	✗

After refactoring...

Clean code	✓
Better code	✓
Easier to understand	✓
Cheaper to modify	✓

What does good code look like?

EVENING/LATE NIGHT		
Channel 4	Channel 5	Channel 5
8.00 Dangerous cocktail: Carver (Mark Wingett) seeks comfort in the bottle and in the friendship of Jehrijo (James Grant) in <i>The Bill</i> .	9.00 Cutting Edge follows the efforts of Helen McKendry to locate the burial place of her mother, who was taken from her home in Belfast in 1972.	6.00 PM 5 News With Kirsty Young. 7335858 (S)
Regional news magazine airs on Monday (S) 674	6.00 The Priory PM Entertainment magazine hosted by Zoë Ball and Jamie Theakston. Featuring guests, music and showbiz news. Series producer Philip Edgar Jones. 720206	6.30 Family Affairs Cat agrees to Pete buying into the salon. Clive is shocked that Adam has left him for Gabby. Repeated tomorrow at 12.30pm. Cast on Sunday (S) 7246950
Evening News with Trevor McDonald with Trevor McDonald 246	7.00 Channel 4 News With Jon Snow. Weather (S) 485113	7.00 Win Beadle's Money Contestants challenge Jeremy Beadle in the quiz. Director Phil Chivers. Producer Dave Morley. 6070939
Amberdale Mike worries about Gavin's marital intentions. 1543	7.55 My Millennium More of the public's millennial wishes. (S) 371842	7.30 Ocean Wilds Dolphin Kingdoms Documentary looking at the spotted dolphin and nurse shark. Director Peder Hestmark. Series producer Mike Richards. (S) 7242194
Weddings A second programme of four following the wedding parades of three couples. Tonight, Zakia explains why 'I won't care if husband-to-be Abdul has a second wife, I Michael and Queenie go in search of some vital residents for their Chinese wedding - a pair of pigs. as producer Mike Mortimer (S) 910	8.00 Brookside Jimmy runs out of sympathy for Lindsey, who is close to tears as Dave sets out his stall at the club. Jessie is shocked to hear the truth about Ray's marriage. For cast see Wednesday (S) 7823 Soap and Planet page 42	8.00 The Real L.A.P.D. In the Line of Fire Officers Chang and Porter are first on the scene when a sniper is reported to be firing on innocent civilians. 6152587
a Bill First of a two-part story which chronicles Carver's slide towards self-destruction. Concludes on Thursday. 1543	8.30 Embarrassing Illnesses Series investigating socially-sensitive medical conditions. Most sexually-transmitted infections are easily detected and simple to treat if caught at an early stage, but can become serious if left undiagnosed. This week's subjects include a woman whose chlamydial infection prevents her from having children without in vitro fertilisation treatment, and another having an operation to remove genital warts. Producer Simon Morton. Series producer Matt Fraser. (S) 9858 Dr Mark Porter on chlamydial health , page 50	8.30 Chef School Last in the documentary series following the fortunes of a group of students at the Tante Marie School of Cookery in Surrey. Producer Anita Brown. Executive producer James Black. (S) 6068194
ak Practice ring On. Andrew's relationship with Dawn reaches skin point, and he has bad news for a close friend. 4465	9.00 Cutting Edge Disappeared in 1972, Catholic convert and widowed mother-of-ten Jean McConville was taken from her Belfast home by the Provisional IRA for interrogation over an incident in which she comforted a dying British soldier shot outside her home. She was never seen again. Following the Good Friday Agreement, McConville's daughter Helen McKendry began a search to identify her mother's burial place. This documentary follows her efforts. Director/Producer Joanna Head. (S) 2620	9.00 Doomwatch Feature-length drama starring Trevor Eve, inspired by the seventies television series about an environmental task force. A Cambridge astrophysicist is caught up in a web of deceit when his research into a cheap form of energy falls into the wrong hands. See Choice. Neil Tennant. Trevor Eve. Meg Tennant. Amanda Serris. Spencer Quire. Philip Stone. Toby Ranks. Miles Anderson. Hugo Cox. Dallas Campbell. Ben Riley. Abbie Byrne. Written by Ian MacDonald and John Howett. Producer Peter Lee-Wright. Director Ray Buttfield. (S) 7257857
Big Match: Champions' League Highlights on from tonight's Champions' League games, adding the clash between Lazio and Chelsea in Rome. coverage of the Chelsea game is at 1.40am. 4465	10.00 Father Ted Escape from Victory: Father Jack jeopardises Craggy Island's chances of winning a five-a-side football match by drinking an entire bottle of sleeping agent. Father Ted. Dermot Morgan. Father Jack. Frank Kelly. Father Dougal. Ando O'Hanlon. Mrs Doyle. Pauline McLynn. Written by Graham Linehan and Arthur Matthews. Producer Lisa Evans. Directors Andy De Emmony and Graham Linehan. (S) (S) 30582	11.05 Serial Killers A look at Charles Manson, the hippy leader who incited his followers to murder. 2659303
Nightly News with Dermot Mulroney with John Hammond (S) 904736	10.30 Small Potatoes Continuing the new comedy series set in north-east London. Secrets. Ed plays a game of secrets with Benetti, with disastrous consequences. Rick has a bad time visiting a friend in hospital, until he meets his friend's nurse. Ed Hewitt. Tommy Tormen. Giles. James Doherty. Rick Roy. Sanjeev Bhaskar. Phil. Jeremy Peters. Benetti. Morgan Jones. Nicky. Valeria Rabbini. Juliet Appleby. Emma Rydal. Juliet Clune. Charlotte Palmer. Host. Omid Djalil. Written and produced by Richard Potts and Stuart Sedens. Director Andy De Emmony. (S) 241649	12.00 Poltergeist: the Legacy Let Sleeping Demons Lie The ghost of Baron de Rais is released. (S) 2253663
onal News: Weather 999465	11.35 La Fille de D'Artagnan Period adventure starring Sophie Marceau. When Eloise is handed the task of avenging a murder, she travels to Paris to enlist the aid of her father, the famed musketeer D'Artagnan. In French with English subtitles. Widescreen Director Bertrand Tavernier (1994, 15) 93554129 Films: pp 14-18 ***	12.55 AM Live and Dangerous NFL Game of the Week Tampa Bay v Minnesota Vikings. 29945903
egade erl Mart. Reno investigates a robbery suspect who's the scene in a racing car. 689755	2.05 AM 4 Later Late-night strand. Ends 3.05am The Other Side Daughters of Buddha. A Buddhist nun looks for a feminine approach to spirituality. (S) 5909040	1.55 NFL Game of the Week Replay San Francisco 49ers v Green Bay Packers. (S) 65238068
Haunted FishTank Television news and views. aired on Friday at 3.00am. 7066514	3.05 Seriously Funny Documentary series about humour. Howard Jacobson looks at how morality has increased in comedy. (S) (S) 1207514	5.00 Euronews Ends 6.00am 8253175
net Rock Profiles Featuring Madness. 6403866	4.05 Football Italia Two top teams compete in a complete Serie A match played last weekend. Ends 6.00am. Another edition is on Thursday at 3.45am. 584021	
Big Match: Champions' League Replay coverage of Lazio v Chelsea. 513446		
Jerry Springer Show Debate. (S) (S) 5156243		
mas Crown - the Making of a Masterpiece filming of The Thomas Crown Affair. (S) 91308392		
NightScreen Text-based information. 6330760		
Morning News Ends 6.00am 31430		

TUESDAY 7 December

TELEVISION

(S) Repeat
(S) Subtitles
(S) Widescreen
when viewed via
digital services
analogue reception
is not affected

Film
(S) Back and white
(S) Phonies

Star ratings
Outstanding

Very good

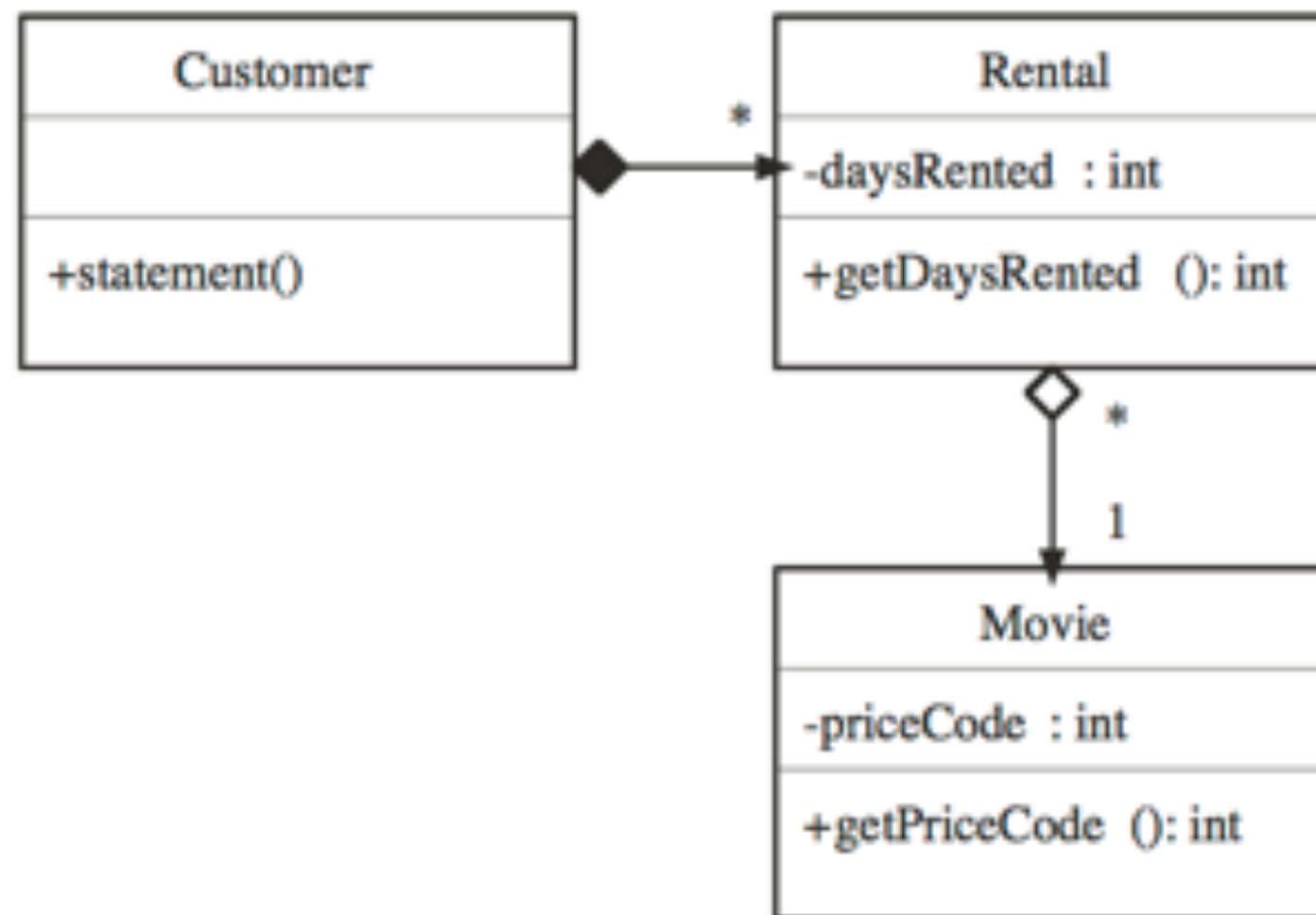
Good
**
Average
*
Poor
*

Latest updates
The Radio Times
website has the
details on www.radio-times.com

Today - the best thing on television and radio.

Refactoring Movies (A Worked Example)

<https://github.com/ludwiggj/refactoringMovies>



Comments on the Starting Program

- When you find you have to add a feature to a program, and the program's code is not structured in a convenient way to add the feature, first refactor the program to make it easy to add the feature, then add the feature.