

# Архитектура для автоматизированного тестирования UI

Антон Бевзюк  
Intel

# План

- Кто?
- Зачем?
- Как?
- Паттерны
- Сложные модели

**KTO?**

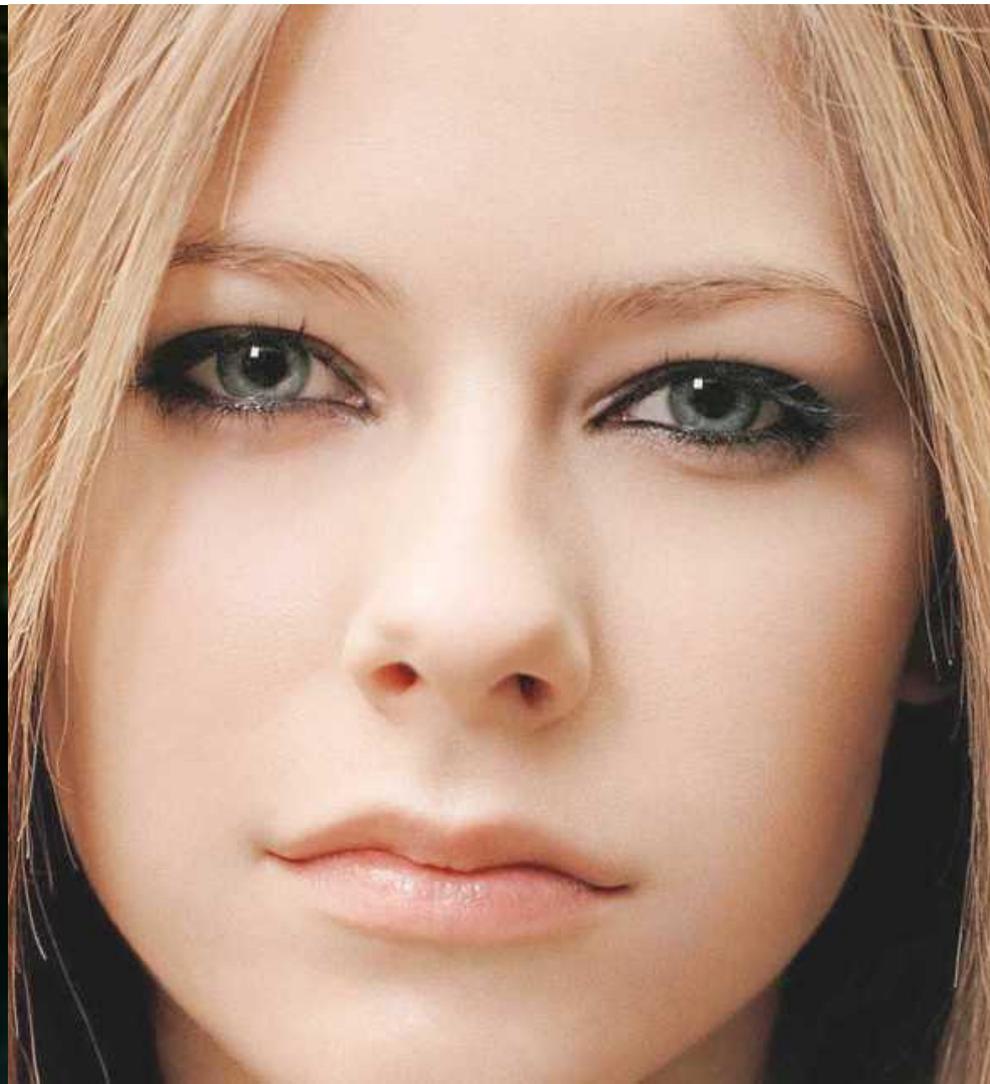
# КТО?



- Программист
- Руководитель разработки
- Тренер студентов и сотрудников

**ЗАЧЕМ?**

# UI – это лицо программы



UI — ЭТО КОД

# UI бывает сложный

The image displays the Antares Filter software interface, which is a complex and cluttered user interface (UI) for audio processing. The interface is divided into several sections:

- Master Section:** Includes a Clip indicator, Filter Display Style (Hz/Note), Tempo Source (Int/MIDI/Clock), Tempo (120.0 bpm), Input Level (-6.4 dB), and MIDI Setup.
- Filter Routing:** A diagram showing the signal path through four filter stages (1, 2, 3, 4) and their connections to various destinations.
- Rhythm Generators:** A section for generating rhythmic patterns, including a Sync knob, Beats, and To Master options.
- Filter Stages (1-4):** Each stage has its own set of controls:
  - Stage 1:** Filter1, Lowpass, 6 poles, 90.0 Hz, 19% Q, -6.5 dB Gain, -54 Pan.
  - Stage 2:** Filter2, Bandpass, 8 poles, 310 Hz, 31% Q, +0.1 dB Gain, -31 Pan.
  - Stage 3:** Filter3, Notch, 8 poles, 1.3 kHz, 18% Q, -3.5 dB Gain, +42 Pan.
  - Stage 4:** Filter4, Highpass, 6 poles, 6.4 kHz, 10% Q, -10 dB Gain, +74 Pan.
- Envelope Follower:** Controls for Attack (15 ms) and Release (150 ms), with a Clip indicator and Output Level (+1.4 dB).
- Filter Characteristics:** A central frequency response graph showing the combined effect of the four filters, with individual filter responses overlaid in yellow, blue, and green.
- Destination List:** A table on the right side of the interface listing destinations and their amounts:

Source	Amount	Dest
1	+36	F1 Freq
2	+15	F1 Freq
3	-21	F2 Freq
4	+36	F2 Pan
5	+45	F3 Q
6	+30	F4 Delay
7	+100	F4 Freq
8	-27	Lfo4 Rate
9	+0	F1 Freq
10	+0	F1 Freq
11	+45	Mod1 Amt
12	+0	F1 Freq

# Поддержка



# Расширяемость

.



Тестирова  
ТЬ  
UI  
нужно



**KAK?**

# Вручную



# Автоматически

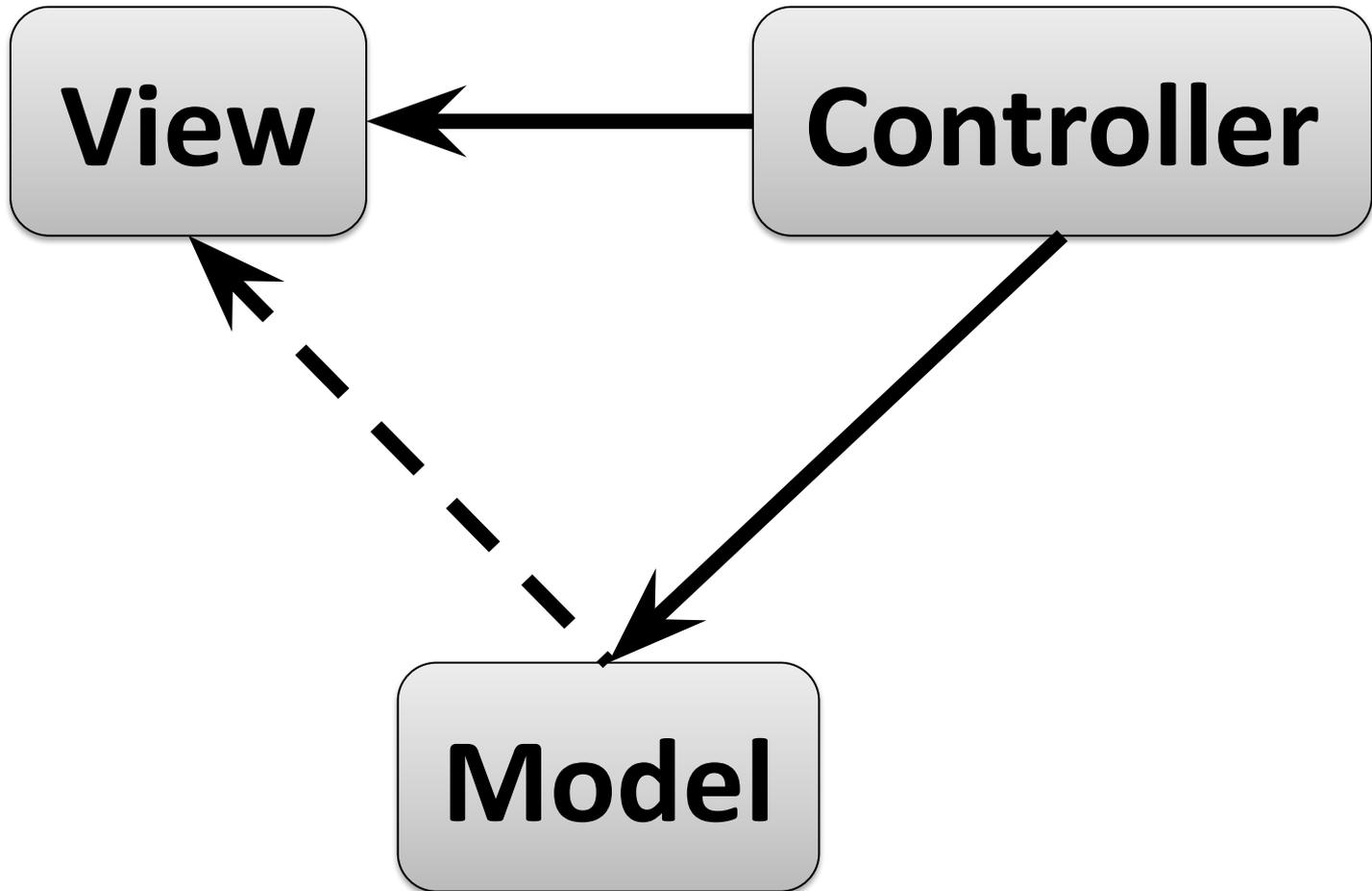


- Через UI

- Unit test

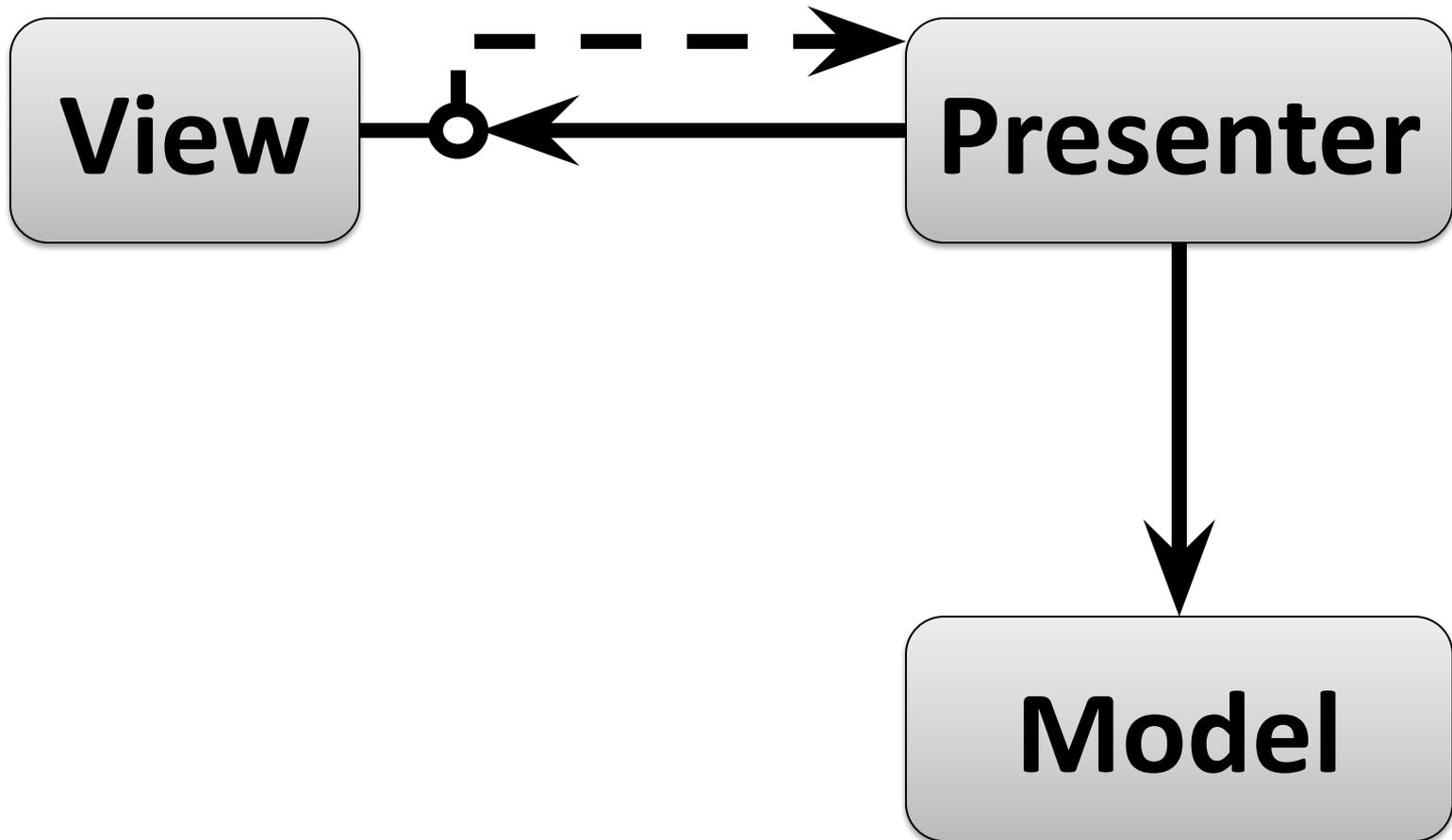
**MVC**

# MVC

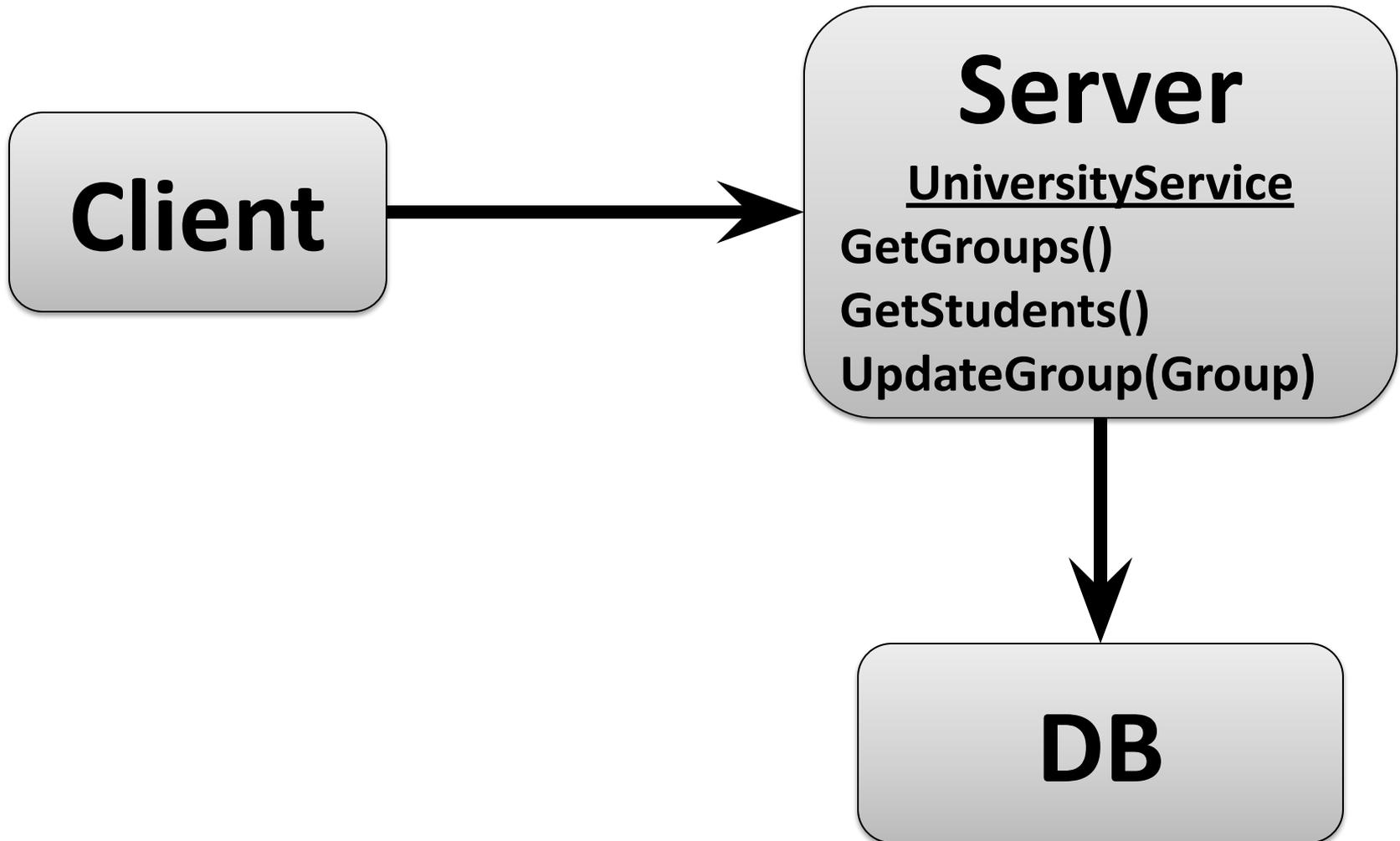


**MVP**

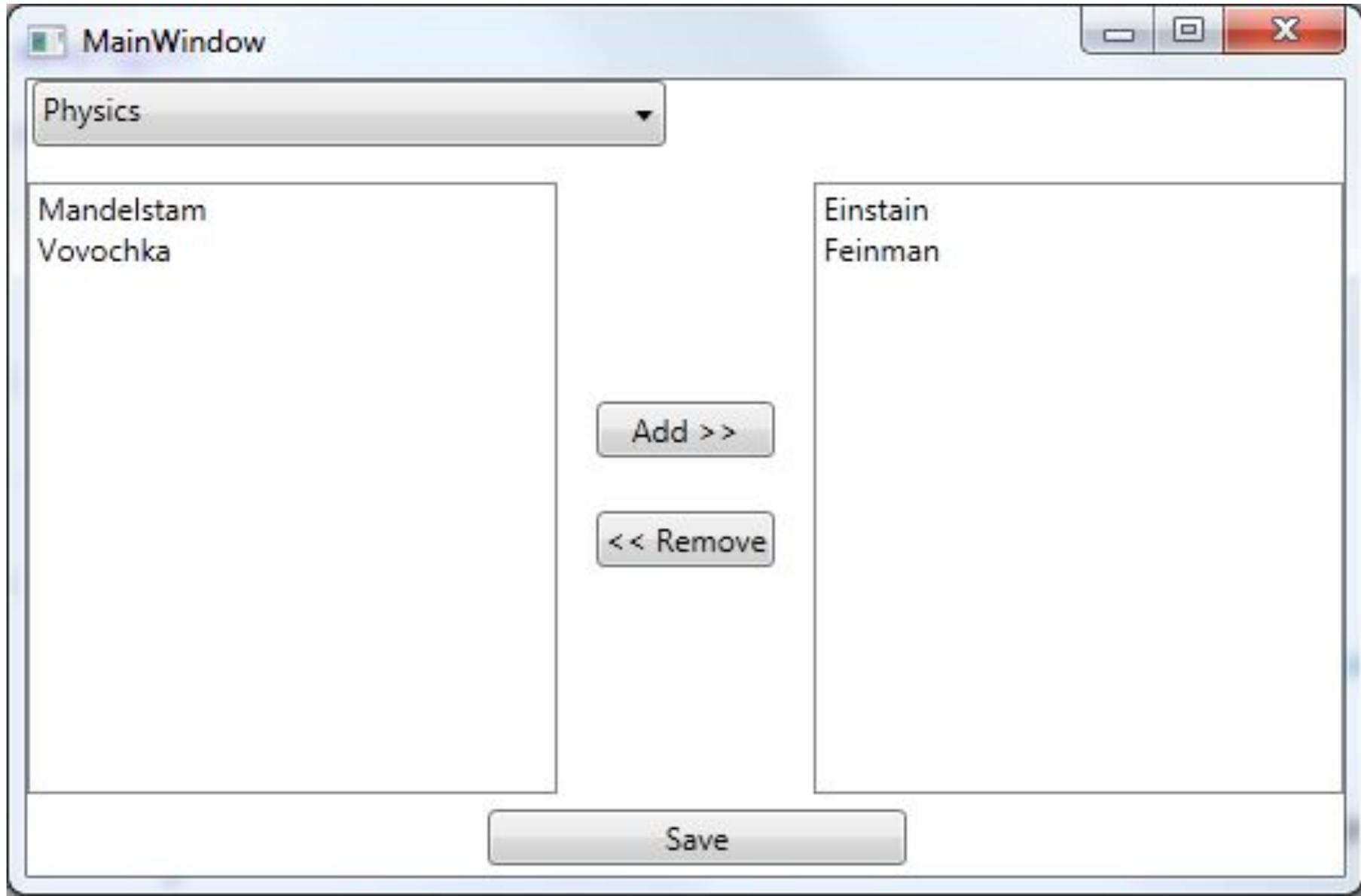
# MVP



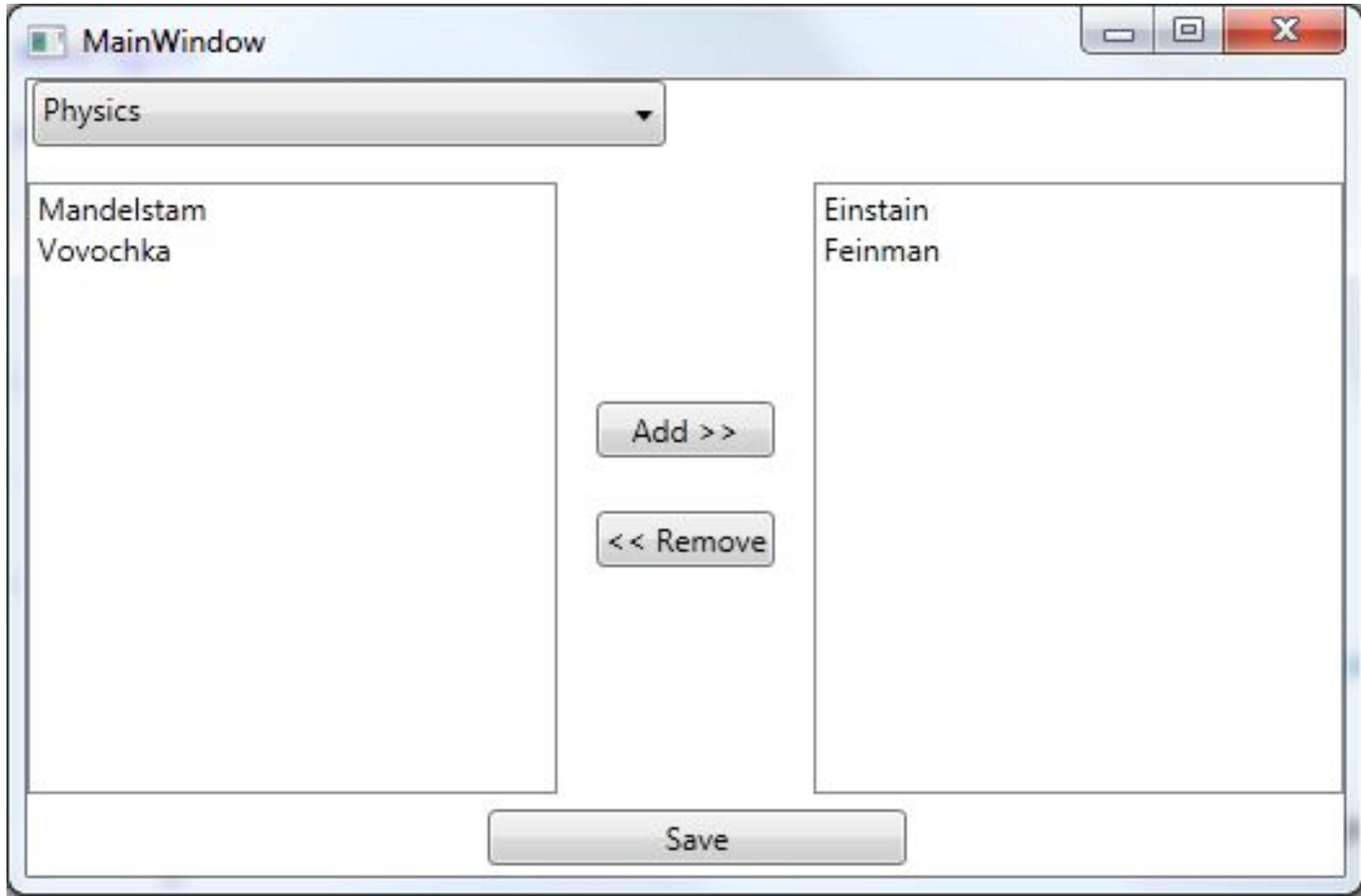
# Архитектура



# Client



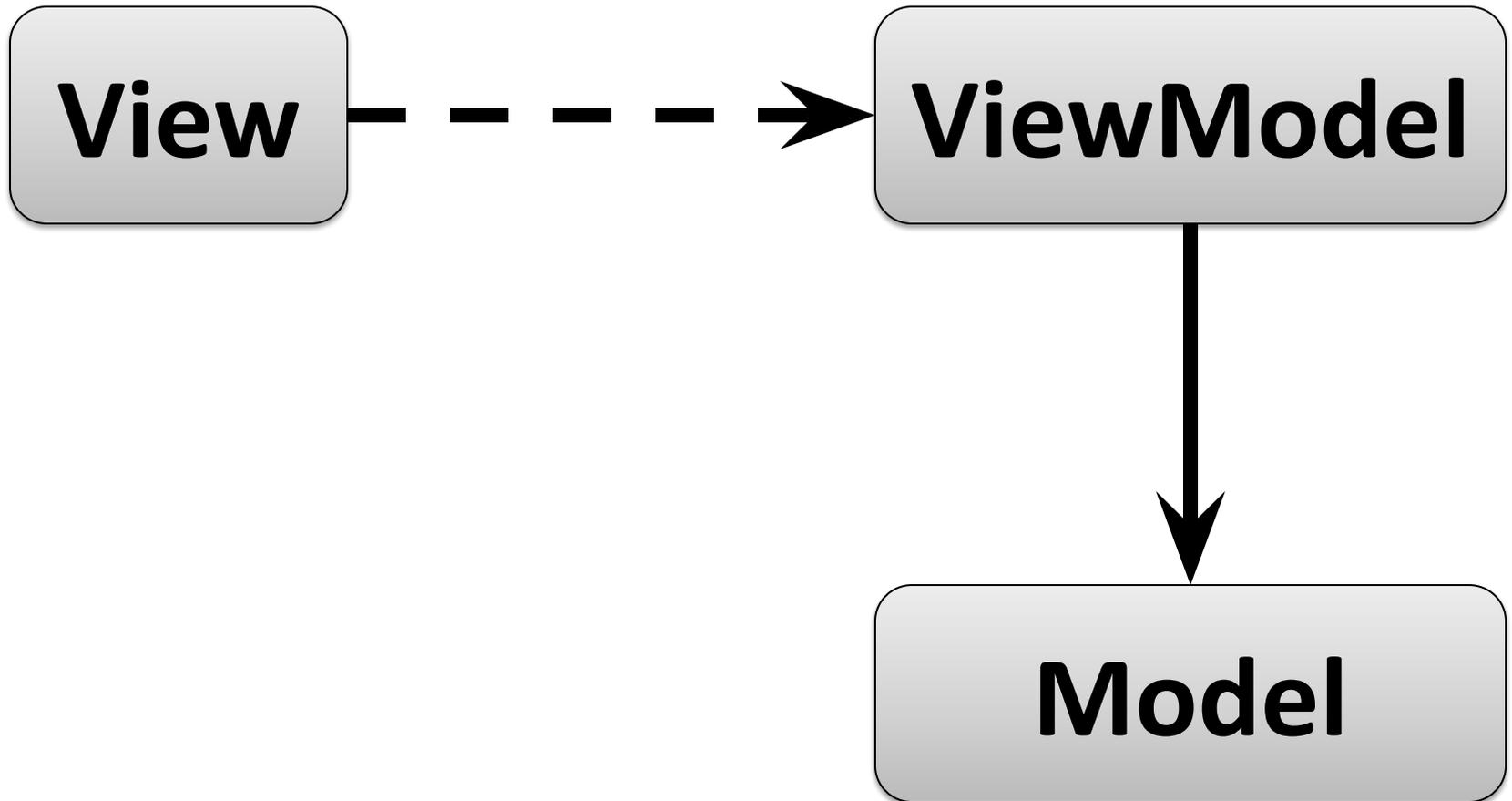
# MVP demo



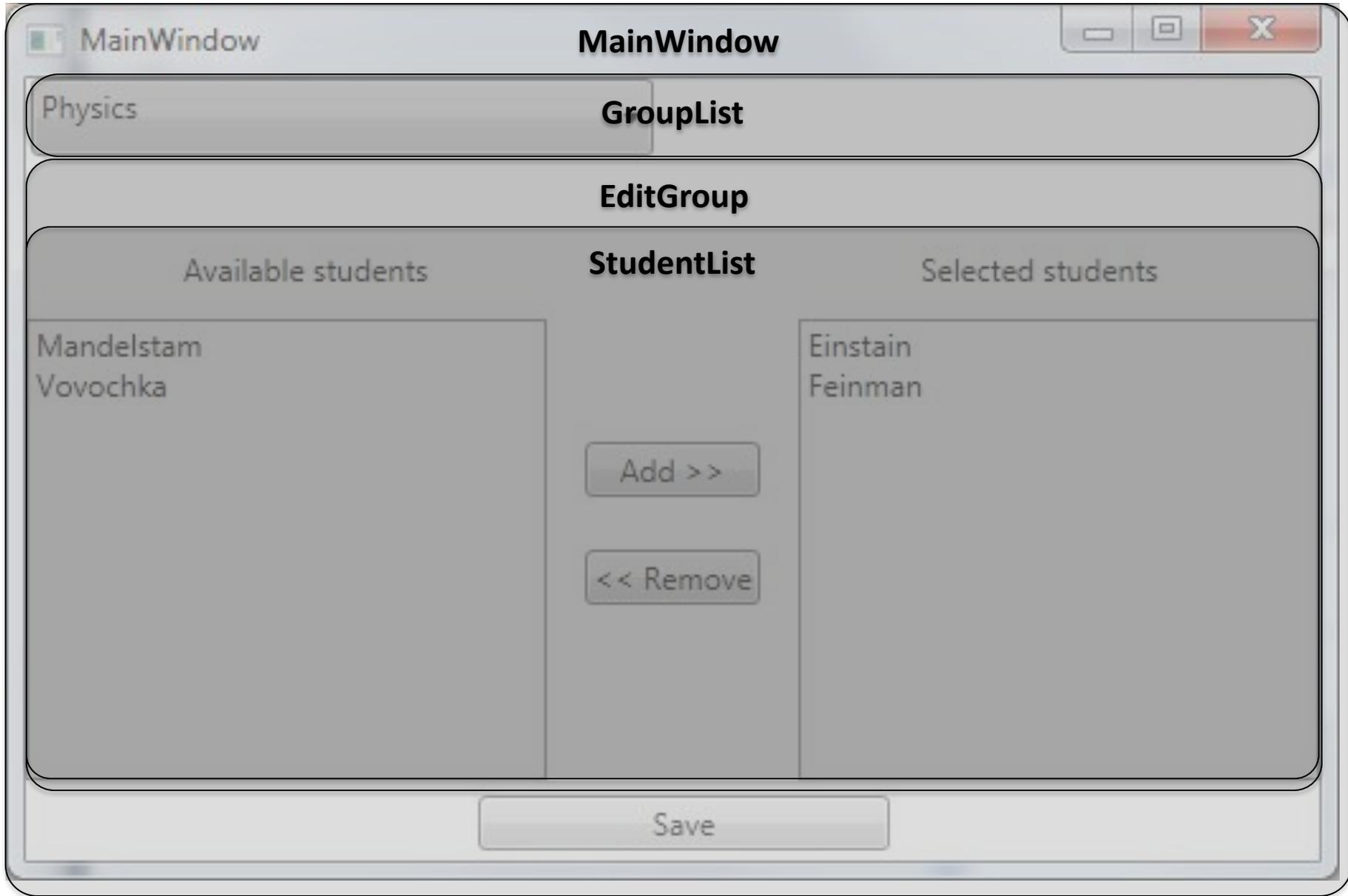
**PM**

**MVVM**

# MVVM



# MVVM demo



# **СЛОЖНЫЕ МОДЕЛИ**

# Как справиться со сложностью?

The image displays the Antares Filter software interface, which is a complex digital audio workstation (DAW) plugin. The interface is organized into several main sections:

- Master Section:** Located at the top left, it includes a Clip indicator, a Filter Display Style selector (Hz or Note), a Tempo Source selector (Int, MIDI, Clock), a MIDI Clock button, a Tempo knob (set to 120.0 bpm), a Tap Tempo button, a MIDI Setup button, and an Input Level knob (set to -6.4 dB).
- Filter Routing:** A central section showing a diagram of the filter chain and a list of routing options (1-6) with corresponding icons.
- Rhythm Generators:** A section at the bottom left with a Sync knob, a Beats knob, and a To Master button, along with a sequence editor for two tracks.
- Filter Channels (1-4):** Four individual filter modules, each with its own set of controls:
  - Channel 1:** Filter1, Lowpass, 6 poles, 90.0 Hz, 19% feedback, -6.5 dB gain, -54 dB pan.
  - Channel 2:** Filter2, Bandpass, 8 poles, 310 Hz, 31% feedback, +0.1 dB gain, -31 dB pan.
  - Channel 3:** Filter3, Notch, 8 poles, 1.3 kHz, 18% feedback, -3.5 dB gain, +42 dB pan.
  - Channel 4:** Filter4, Highpass, 6 poles, 6.4 kHz, 10% feedback, -10 dB gain, +74 dB pan.
- Envelope Follower:** A section on the right with Attack and Release knobs (15 ms and 150 ms), a Clip indicator, and an Output Level knob (set to +1.4 dB).
- Filter Frequency Response Graph:** A central graph showing the frequency response of the filters, with a color-coded spectrum (yellow, blue, red, green) and a logarithmic frequency axis from 30 Hz to 16 kHz.
- Filter Parameters:** A table on the right side of the interface listing various parameters and their values:

Source	Amount	Dest
1	Env 1 +36	F1 Freq
2	Lfo 1 +15	F1 Freq
3	Follower -21	F2 Freq
4	Lfo 2 +36	F2 Pan
5	Lfo 3 +45	F3 Q
6	Lfo 4 +30	F4 Delay
7	M Note A +100	F4 Freq
8	M Pres B -27	Lfo4 Rate
9	Follower +0	F1 Freq
10	RG 1 +0	F1 Freq
11	Env 2 +45	Mod1 Amt
12	M Note A +0	F1 Freq

# Декомпозиция

The image displays the Antares Filter software interface, which is used for audio signal processing. The interface is divided into several sections:

- Master Section:** Includes a Clip indicator, Filter Display Style (Hz/Note), Tempo Source (Int/MIDI/Clock), Tempo (120.0 bpm), and Input Level (-6.4 dB).
- Filter Routing:** A diagram showing the signal path through four filter stages (1, 2, 3, 4).
- Rhythm Generators:** A section for generating rhythmic patterns, including Sync, Beats, and To Master controls.
- Filter Stages (1-4):** Each stage has its own set of controls:
  - Stage 1:** Filter1, 90.0Hz, 19%, Lowpass, 6 Poles, Delay 0%, Gain -6.5 dB, Phase Invert.
  - Stage 2:** Filter2, 310Hz, 31%, Bandpass, 8 Poles, Delay 0%, Gain -0.1 dB, Phase Invert.
  - Stage 3:** Filter3, 1.3kHz, 18%, Notch, 8 Poles, Delay 100 ms, Gain -3.5 dB, Phase Invert.
  - Stage 4:** Filter4, 6.4kHz, 10%, Highpass, 6 Poles, Delay 545 ms, Gain -10 dB, Phase Invert.
- Envelope Follower:** Controls for Attack (15 ms) and Release (150 ms), and a Clip indicator.
- Output Level:** A meter and knob showing the final output level at +1.4 dB.
- Source Amount Dest Table:** A table on the right side of the interface listing various sources and their amounts:

Source	Amount	Dest
1 Env 1	+36	F1 Freq
2 Lfo 1	+15	F1 Freq
3 Follower	-21	F2 Freq
4 Lfo 2	+36	F2 Pan
5 Lfo 3	+45	F3 Q
6 Lfo 4	+30	F4 Delay
7 M Note A	+100	F4 Freq
8 M Pres B	-27	Lfo4 Rate
9 Follower	+0	F1 Freq
10 RG 1	+0	F1 Freq
11 Env 2	+45	Mod1 Amt
12 M Note A	+0	F1 Freq

# События

**EventManager**

```
graph TD; VM2[ViewModel2] -.-> EM[EventManager]; VM1[ViewModel1] -.-> EM; EM -.-> VM3[ViewModel3];
```

**ViewModel1**

**ViewModel2**

**ViewModel3**

# Агрегация

**MainViewModel**

**ChildViewModel1**

**ChildViewModel2**

**ChildViewModel3**

# Еще раз

- Тестировать UI нужно
- Способов много
- MVC
- MVP
- MVVM
- Сложные модели

# Спасибо!

АНТОН БЕВЗЮК

[anton.bevzjuk@pisem.net](mailto:anton.bevzjuk@pisem.net)

Skype: anton.bevzyuk

ICQ: 26248832

