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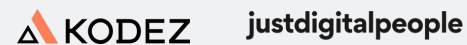
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# MINIMUM VIABLE PROGRAMMER

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# Minimum Viable Programmer

"Eight hours' labour, Eight hours' recreation, Eight hours' rest"

- Robert Owen, 1817



# Minimum Viable Programmer



Totally a photo of me,  
not Stable Diffusion



# Minimum Viable Programmer



Totally a photo of me,  
not Stable Diffusion



# Minimum Viable Programmer

“great, another armchair psychologist.”

- probably you right now



# Minimum Viable Programmer

## **Last Responsible Moment**

Investments

Hustle?



# Minimum Viable Programmer

Last Responsible Moment

**Investments**

Hustle?





# Minimum Viable Programmer

Last Responsible Moment

Investments

**Hustle?**



# Minimum Viable Programmer

Last Responsible Moment



# Minimum Viable Programmer

Concurrent development makes it possible to delay commitment until the last responsible moment, that is, **the moment at which failing to make a decision eliminates an important alternative.**

- *Lean Software Development: An Agile Toolkit*, by Mary and Tom Poppendieck  
(emphasis mine)



# Minimum Viable Programmer

Concurrent development makes it possible to delay commitment until the last responsible moment, that is, **the moment at which failing to make a decision eliminates an important alternative.**

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Sunk cost fallacy  
Cost-Benefit analysis  
Asking good questions  
Applying the LRM principle  
Breaking the rules  
Deferring learning  
Hustle vs Sustainability



# **Sunk cost fallacy**

Cost-Benefit analysis

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# Sunk cost fallacy

**Sunk cost:** something that has been spent and can't be recovered



# Sunk cost fallacy

“I paid \$10000 for these stocks, I can't sell them for \$5000!”

*(even though you could use that \$5000 for an investment that has a better future return than your existing investment)*





# Sunk cost fallacy



“A past team member wrote a key component in our system using Elixir.

It’s buggy, the team member has moved on, and nobody knows enough Elixir to maintain it.

*This component is starting to become a liability.”*



# Sunk cost fallacy



elixir

"We're *invested* in using Elixir now, Employee X spent 5 weeks writing this component.

We can't just throw that work away."

- someone deep in the sunk cost fallacy



# Sunk cost fallacy

1. Keep the component, learn Elixir, and take 4x time to fix the bugs and maintain the component,

Or,

2. Throw away the five developer weeks you've invested, rewrite the component in C# (which the entire team is familiar with), and fix the bugs.



# Sunk cost fallacy

1. Keep the component, learn Elixir, and take 4x time to fix the bugs and maintain the component,

Or,

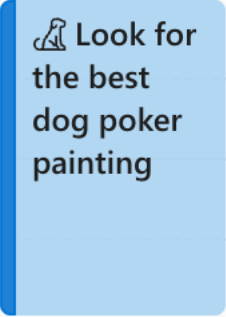
2. Throw away the five developer weeks you've invested, rewrite the component in C# (which the entire team is familiar with), and fix the bugs.



# Sunk cost fallacy

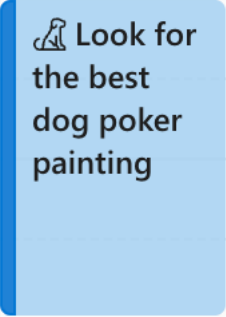


# Sunk cost fallacy

7 PM		
8 PM		
9 PM		

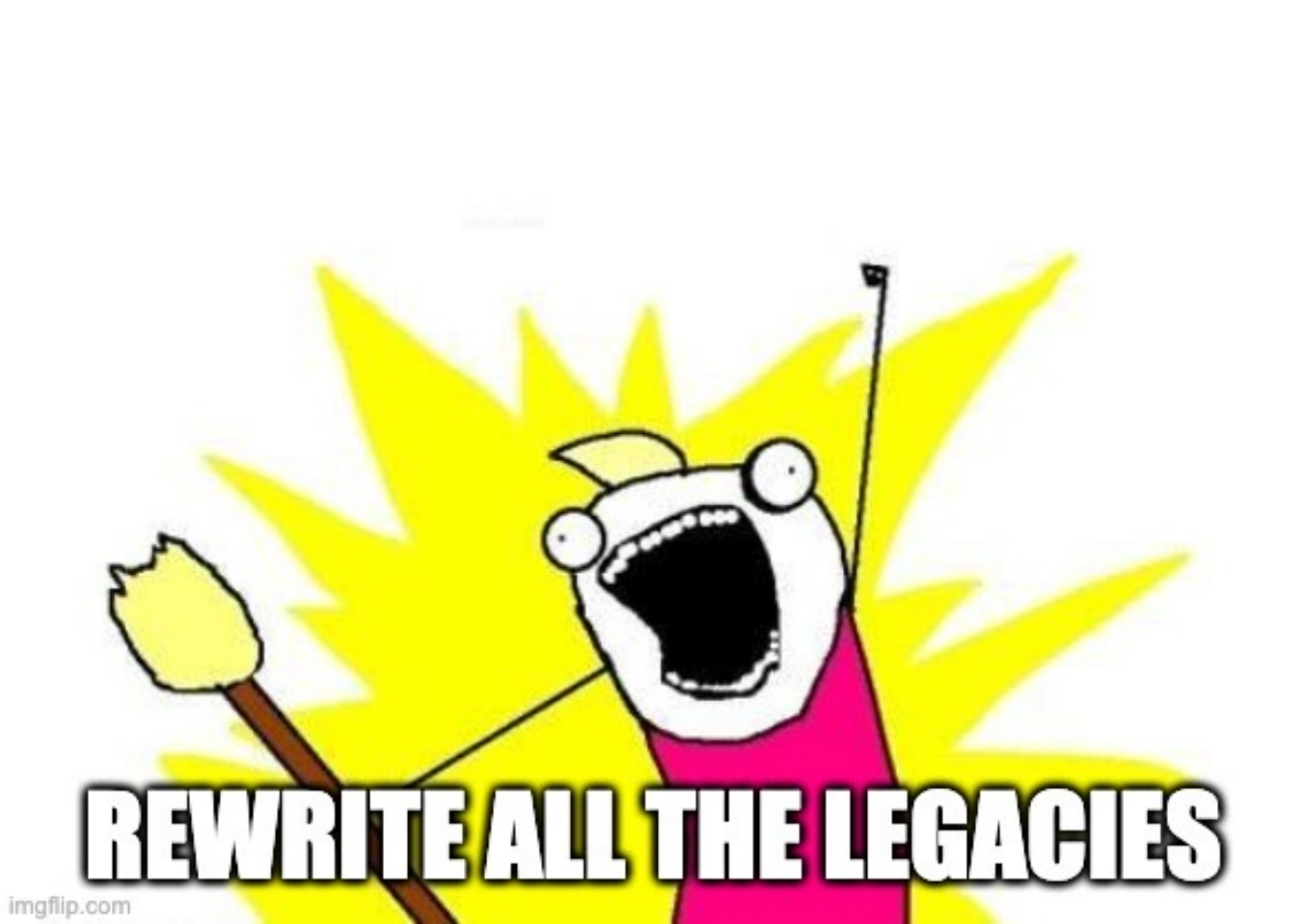


# Sunk cost fallacy

7 PM		
8 PM		
9 PM		



# Sunk cost fallacy





# Sunk cost fallacy

3. Port the Elixir code to C#



# Sunk cost fallacy

The **sunk cost fallacy** is the tendency for decisions that we've made and costs that we've incurred *in the past* to influence our *future decisions*, at the risk of making poor decisions.



Sunk cost fallacy

## **Cost-Benefit analysis**

Asking good questions

Applying the LRM principle

Breaking the rules

Deferring learning

Hustle vs Sustainability



Sunk cost fallacy

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# Cost-Benefit analysis

C14		fx =C6/C12	
	A	B	C
1			
2		<b>Particulars</b>	<b>Total</b>
3		<b>Benefits</b>	
4	A)	Increase in Revenue	\$250,000
5	B)	Increase in Additional Revenue	\$30,000
6		<b>Total Benefits ( A + B )</b>	<b>\$280,000</b>
7			
8		<b>Costs</b>	
9	D)	Salary of New Employees	\$160,000
10	E)	Cost of Hiring	\$15,000
11	F)	Cost of Additional Hardware and Software	\$25,000
12		<b>Total Costs ( D + E + F )</b>	<b>\$200,000</b>
13			
14		<b>Benefit Cost Ratio</b>	<b>1.40</b>
15			

Benefit- Cost Ratio =  
Benefits available  
from the project /  
Total value of Costs



# Cost-Benefit analysis

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Benefit- Cost Ratio = Benefits available from the project / Total value of Costs

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# Cost-Benefit analysis

(not the client's application)

### 1 Page Business Financial Summary Statement

This page covers the single pager for projected financial planning of a business.

Company Name: Logo

#### Projected Enterprise & Equity Value

Week 1-7: Enterprise Value (blue), Equity Value (red)

#### Project Feasibility Analysis

Exit Valuation Selected Method: EV/Active User  
 EV/Active User: 22.00  
 Valuation Multiple Exit: 2.00

Settings: Investment Period: 8 Years, WACC: 13.0%

Target Exit Valuation Multiple Inputs:

EV/Revenue	1.0x	16.0%
EV/EBITDA	1.0x	16.0%
EV/Op. Income	1.0x	16.0%
EV/Active User	USD/Active	22.0%
EV/Subscriber	USD/Subscriber	22.0%

Break-Even (EBITDA): 3011  
 Cash Break Year: 12000  
 Required App. Installs: 277718

Model Checks:  Automatic,  Inbuilt,  User

Project Metrics	USD	780748
Funding	USD	3361962
Profit	USD	3552927
Revenue	USD	18.5%
Margin	%	84.4%
ROI	USD	960208
Break Even	Years	1.8 (EBITDA)
Project	Years	8

Funding	USD	1702148
Profit	USD	2361962
Revenue	USD	3552927
Margin	%	18.5%
ROI	USD	960208
Break Even	Years	1.8 (EBITDA)
Project	Years	8

Funding	USD	309818
Profit	USD	3326278
Revenue	USD	3552927
Margin	%	12.4%
ROI	USD	57.8%
Break Even	Years	1.8 (EBITDA)
Project	Years	8

#### Users & Sources of Funds

Users of Fund: Reserve (341240), Debt Service (200000), CAPEX (200000), Operations (1000000), Development Costs (7000000), Loan A, B (Equity 2,059,616)

#### Funding, Users & Sources

Users of Funds	USD	20000
CAPEX	USD	100000
Development Costs	USD	140000
Operations	USD	300000
Reserve	USD	300000
Debt Service	USD	0
Total	USD	2000000
Stack	USD	0

Sources of Funds	USD	0
Loan A	USD	0
Loan B	USD	0
Equity	USD	2059616
Total	USD	2059616

#### Equity Stakes

45%, 65%, 85%

- Founder
- Investor 1
- Investor 2
- Investor 3
- Investor 4
- Investor 5

#### New Investment

100%

#### Pre & Post-Money Valuation

Pre-Money Valuation: 30,89,430  
 Equity Funding: 20,59,620  
 Post-Money Valuation: 51,49,050

Investor	USD	AS	Founders	Investor 1	Investor 2	Investor 3	Investor 4	Investor 5
Revenue	USD	21307969	1720158	8111418	-	-	-	-
Profit	USD	21427590	1528548	8111418	-	-	-	-
Revenue	%	13.2%	NA	4.8%	NA	NA	NA	NA
Margin	%	80.0%	NA	80.0%	NA	NA	NA	NA

Investor	Equity %	% of Funding	USD
Investor 1	42.0%	90.0%	2098000
Investor 2	3.0%	6.0%	0
Investor 3	3.0%	6.0%	0
Investor 4	3.0%	6.0%	0
Investor 5	3.0%	6.0%	0
Total	100.0%	100.0%	2098000

Entry Valuation	USD	%
Pre-Money Valuation	3089430	100%
Equity Funding	2059620	66.7%
Post-Money Valuation	5149050	166.7%

Exit Valuation	USD	%
Equity Value at Exit	1900000	36.9%
Target Multiple	2.0x	



# Cost-Benefit analysis

(not the client's application)

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EV/EBITDA	1.0x	16.0%
EV/Op. Income	1.0x	16.0%
EV/Active User	USD/Active	22.00
EV/Subscriber	USD/Subscriber	22.00

Break-Even (EBITDA): 301  
 Cash Break Year: 12000  
 Required App. Installs: 277718

Model Checks:  Automatic,  Inbuilt,  User

#### Equity Funding Buffer USD: 295872

Project Metrics	USD	1760748	1760748	309819	309819
Funding	USD	3361962	2361962	3322679	2326761
Revenue	USD	3550267	3550267	3550267	2522726
Margin	%	18.5%	18.5%	12.4%	10.3%
ROI	%	84.4%	84.4%	57.8%	86.7%
UpX	USD	966028	-	-	-
Break Even	Years	1.8 (EBITDA)	-	-	-
Project	Years	3.5	-	-	-

#### Investor Cash Flows

Loan A	USD	0
Loan B	USD	0
Equity	USD	209430
Total	USD	209430

#### Adjusted Cash Flow

Loan A	USD	0
Loan B	USD	0
Equity	USD	209430
Total	USD	209430

#### Users & Sources of Funds

Users of Fund

Users of Fund

Loan A, B

Equity 2,059,616

#### Funding, Users & Sources

Users of Funds	USD	200000
CAPEX	USD	100000
Development Costs	USD	100000
Oper. Income	USD	140000
Reserves	USD	300000
Debt Service	USD	0
Total	USD	200000
Stock	USD	0

Investment of Funds	USD	0
Loan A	USD	0
Loan B	USD	0
Equity	USD	209430
Total	USD	209430

#### Settings

Max Funding Required in Month: 25  
 Equity Returned in Month: 25  
 Funding period: 3.0 Months  
 Funding: OK

#### Equity Stakes

#### New Investment

#### Pre & Post-Money Valuation

#### Investor Summary

Investor	USD	AS	Founders	Investor 1	Investor 2	Investor 3	Investor 4	Investor 5
Revenue	USD	23307969	1728158	8111438	-	-	-	-
Profit	USD	23427590	1528548	9101108	-	-	-	-
Equity Multiple	x	13.2x	NA	4.8x	NA	NA	NA	NA
Investor ROI	%	36.0%	NA	30.0%	NA	NA	NA	NA

Cash Flow Data: adjusted Cash Flows

#### Shareholders Structure

Investor	Equity % of Funding	USD
Investor 1	42.0%	880000
Investor 2	3.0%	63000
Investor 3	3.0%	63000
Investor 4	3.0%	63000
Investor 5	3.0%	63000
Total	100.0%	2094300

#### Entry & Exit Valuation

Entry Valuation	USD	%
Pre-Money Valuation	3089430	80.0%
Equity Funding	2094300	52.0%
Post-Money Valuation	5183730	100.0%

Exit Valuation	USD	%
Equity Value at Exit	1900000	36.7%
Target Multiple	2.3x	-





# Cost-Benefit analysis

## Full, deep analysis

Cost	Benefit
Lots of work	Full understanding of the application
Not very fun	Can give a detailed explanation of the implementation
Will take a long time	Very low risk for the eventual implementation

## Limited, high-level analysis

Cost	Benefit
Higher risk when implementing	Fast
Doesn't teach me details about the application	Don't have to dive into lots of code
Can't give a detailed explanation	I don't have to understand the entire system
Leaves some questions unanswered	Provides the answers that are needed <i>right now</i>
Increased chance that <b>I might be wrong</b>	



# Cost-Benefit analysis

“Do I need to *completely* understand the application **right now?**”



# Cost-Benefit analysis

## Full, deep analysis

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Lots of work	Full understanding of the application
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# Cost-Benefit analysis

- What data is coming in – *inputs*
- What we want to see – *outputs*
- What additional data we need to do that
- Where the filtering needs to happen



# Cost-Benefit analysis

- What data is coming in – *inputs*
- What we want to see – *outputs*
- What additional data we need to do that
- Where the filtering needs to happen



# Cost-Benefit analysis

**Cost-benefit analysis** is an approach to evaluating the pros and cons of a decision, by making a comparison of the costs and benefits of that decision.

**It gives us a systematic framework to compare alternative decisions.**



Sunk cost fallacy

Cost-Benefit analysis

**Asking good questions**

Applying the LRM principle

Breaking the rules

Deferring learning

Hustle vs Sustainability



# Asking good questions


## Step Zero

“Bring me your *finest* subject matter experts!”







# Asking good questions

 FEATURE 682\*

**682** Improve the customer details form

[0 Comments](#) [Add Tag](#)

State  New      Area 

Reason  New      Iteration 

**Description**

TBA



# Asking good questions

Context!



# Asking good questions

“Does this date field need the time?”

VS

“Can you explain to me what this field is going to be used for?”



# Asking good questions

“Does this date field need the time?”

VS

“Can you explain to me what this field is going to be used for?”



# Asking good questions

“That field is to record the time we did the maintenance work.”

**Clarify:** “Is that the time you started the work, or when you finished it?”



# Asking good questions

**Information bias:** The tendency to collect more information that is needed to understand a problem, or make a decision



# Asking good questions

Take time to reflect on your understanding

Don't make assumptions

Iterate



# Asking good questions

Find the right people.

Get the right context.

Avoid leading questions.

Ask open-ended questions.

Ask for clarification.

Avoid the information bias – prefer valuable questions.

Avoid making assumptions.

Reflect and iterate.





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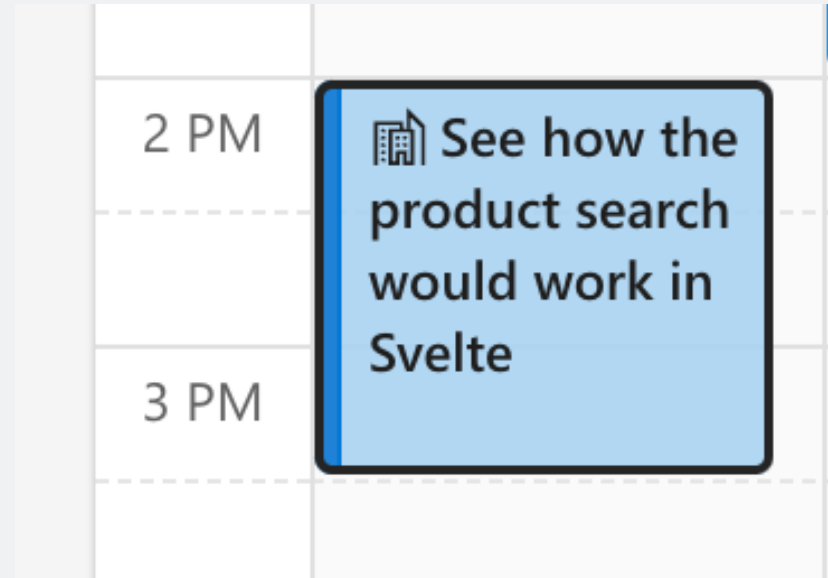


# Applying the Last Responsible Moment principle

**Ambiguity effect:** tending towards a choice we're more familiar with, even given a choice with a better outcome



# Applying the Last Responsible Moment principle



# Applying the Last Responsible Moment principle



Every good tech slide deck needs a page full of database vendor logos



# Applying the Last Responsible Moment principle



# Applying the Last Responsible Moment principle



# Applying the Last Responsible Moment principle



# Applying the Last Responsible Moment principle

Remember the Ambiguity effect.

Time-box investigations.

Set yourself up to pivot easily.

Seek feedback early.





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# Breaking the rules

## **SOLID principles**

- Single Responsibility
- Open-closed
- Liskov Substitution
- Interface Segregation
- Dependency Inversion



Barbara Liskov. Invented the “L”!



# Breaking the rules

## **SOLID principles**

- Single Responsibility
- Open-closed
- Liskov Substitution
- Interface Segregation
- Dependency Inversion



Barbara Liskov. Invented the “L”!



# Breaking the rules

*Given the production configuration*

Determine if the email service can reach and authenticate with the SMTP server but don't send anything

So the user can know if the system is healthy



# Breaking the rules

SIGPLAN Notices

28

1973 February

## GLOBAL VARIABLE CONSIDERED HARMFUL

W. Wulf, Mary Shaw  
Carnegie-Mellon University  
Pittsburgh, Pa.

In 1968 E. W. Dijkstra wrote a letter to the editor of the CACM [1] proposing that the **goto** statement be abolished from all "higher level" programming languages. Although this suggestion has not met with universal acceptance, we would like to nominate another well-known language construct as a candidate for abolition: the non-local variable.

We claim that the non-local variable is a major contributing factor in programs which are difficult to understand. For the moment we wish to keep the phrase "non-local variable" somewhat vague. Roughly, however, we mean any variable which is accessed, and particularly modified, over a relatively large span of program text. More specifically, we mean any variable referenced in a segment of program, S, such that not all uses of that variable are contained in S. We always intend conceptual locality, rather than textual locality: it may be the case that a single conceptual unit,



# Breaking the rules

The Rule of Three: **Three strikes and you refactor**



# Breaking the rules

“If you finesse, you end in a mess.”

- David French, small-town financial planner



# Breaking the rules

Know the rules, and when to break them.

Embrace the Rule of Three

“If you finesse, you end in a mess”





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Hustle vs Sustainability



# Deferring learning

“A monad is a monoid in the category of endofunctors, what’s the problem?”

- James Iry



# Deferring learning

“A monad is a monoid in the category of endofunctors, what’s the problem?”

- James Iry



# Deferring learning

“It’s three AM and I feel like I’ve barely scratched the surface of hardware description languages. I’ve got to start work in six hours to write this web application, and I still don’t really understand what a React hook does. I forgot to take the garbage out. I need a shower.”



# Deferring learning

Our industry moves faster than we could ever hope to.

Learn for fun and for work, not because of FOMO.

Take professional development opportunities seriously.

Apply LRM and cost vs benefit to learning.



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**Hustle vs Sustainability**



# Hustle vs Sustainability

Burn-out



# Hustle vs Sustainability

Burn-out





# Hustle vs Sustainability

Burn-out



# Almost done...

**Time is finite**, spend it carefully.

**Cognitive biases** affect our decision making processes.

Use **LRM** and **Cost-Benefit analysis** to make effective decisions.

Get good information by **asking good questions**.

**Know the rules**, so you **know when to break them**.

Make good decisions when **learning** and during **professional development**.

**Small decisions** make up **long-term sustainability**.

So, **make good decisions for yourself**.



# Almost done...

**Time is finite**, spend it carefully.

**Cognitive biases** affect our decision making processes.

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Get good information by **asking good questions**.

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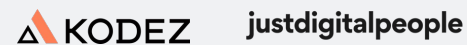
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