

# Technical and Functional Documentation

# Why the Aversion to Writing Documentation?

**“I’m a developer, not a writer.”**

**“I don’t have time.”**

**“No one reads documentation.”**

**“I already know how it works.”**



In the end, it could be  
terrible documentation



Developer

- Understands the product
- Intelligent
- Good writing skills
- Command of the English language



# Why Developers Are Not the Best Writers

Too close to  
the product

Write from the  
developer's  
perspective,  
not the user's

Hard to remove  
bias and  
assumptions



# Why Technical Writing Is Important (Even for Developers)

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# #1

**Marketing:**  
**You have to sell your product**



# #2

**Gets the information out of your head**  
(people will stop asking you for it)



# #3

Gets the team “on the same page”



# #4

**Reduces support calls  
Makes users happier**



# #5

An auditor might want to know



# #6

It's a direct reflection of you



A word about Agile...

“Working software over comprehensive documentation.”

Agile Manifesto





# Essential, Valuable, Timely Documentation

## Essential

Document with just barely good enough detail

## Valuable

The benefit of having documentation must outweigh the cost of creating and maintaining it

## Timely

Documentation should be done in a just-in-time (JIT) manner, when we need it



# Technical Writing: An Overview

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# Technical Writing

Writing that helps users solve problems with technologies and technical subject matter

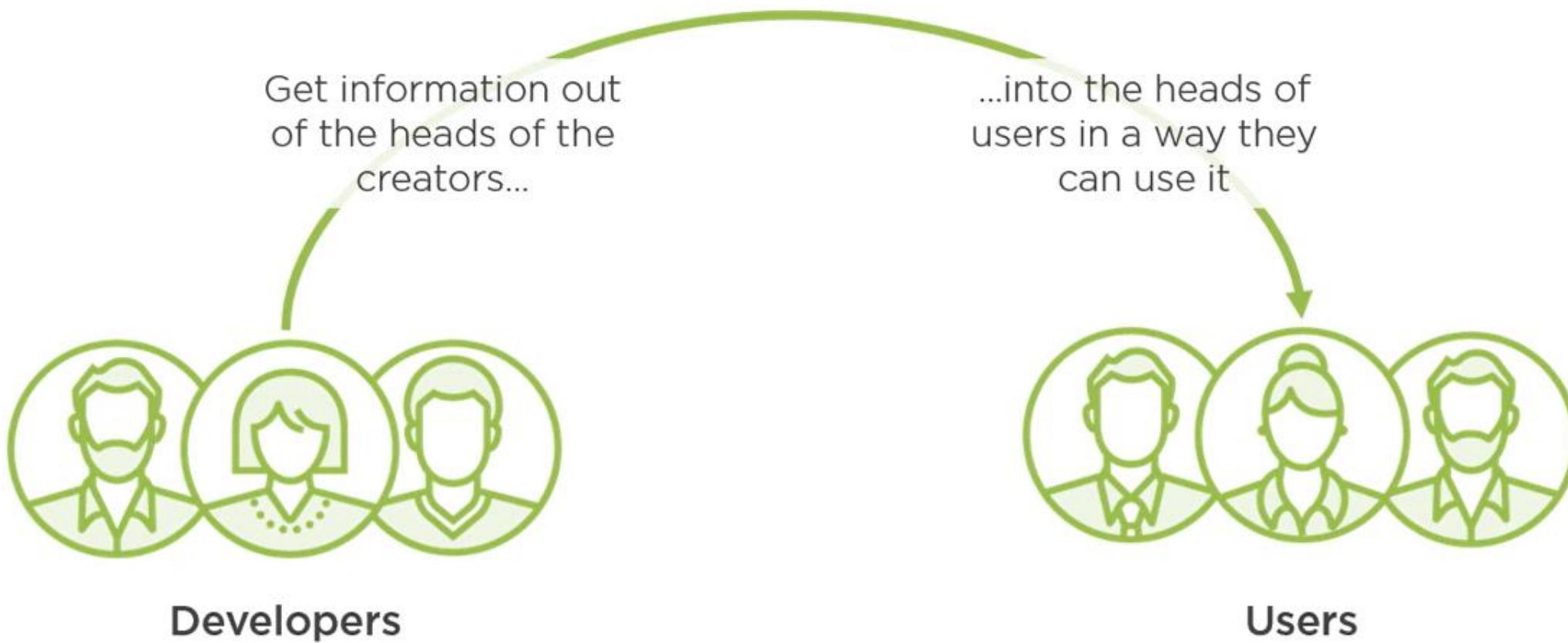


# GOOD Technical Writing

Makes the complex simple



# The Purpose of Technical Writing



# Common Technical Documents

Case studies	Instructions and procedures	Specifications
Descriptions	Memos	Technical reports
Emails	Press releases	White papers
Letters	Proposals	Websites
	Résumés and job applications	



# Fields for Technical Writing

Aeronautics

Biotechnology

Chemistry

**Computer  
software** and  
hardware

Consumer  
electronics

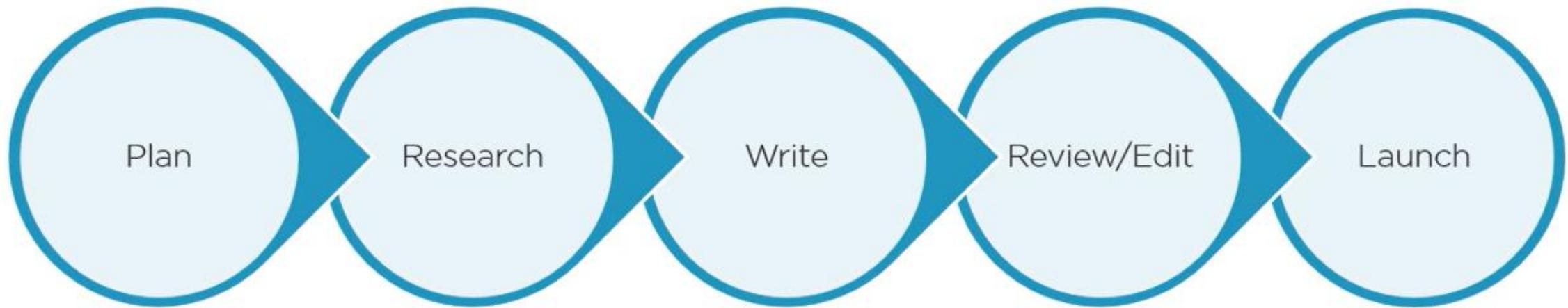
Engineering

Finance

Robotics



# The Writing Process



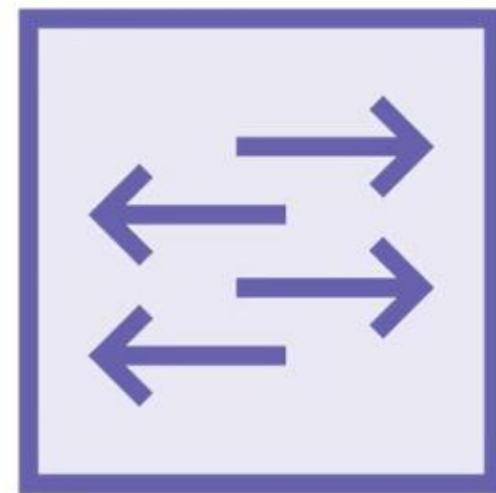
# Plan Phase



Purpose



Audience



Delivery



**Purpose:**  
Why will the  
document exist?



If a document doesn't have  
a purpose, it shouldn't exist

# Document Purposes

Persuade readers to think or act a certain way

Enable them to perform a task

Help them understand something

Change their attitude



# Purpose of Software Documentation

## Requirements

Identify what is to be built, and to verify we're meeting stakeholders' expectations

## Design/Architecture

Defines how the system will be constructed, describing critical components and how they fit together

## Code/Technical

Enable task completion and understanding

## Test Plans/Test Cases

Define the approach to testing; expose errors or demonstrate correct behavior

## End-User

Enable task completion; provide support and troubleshooting



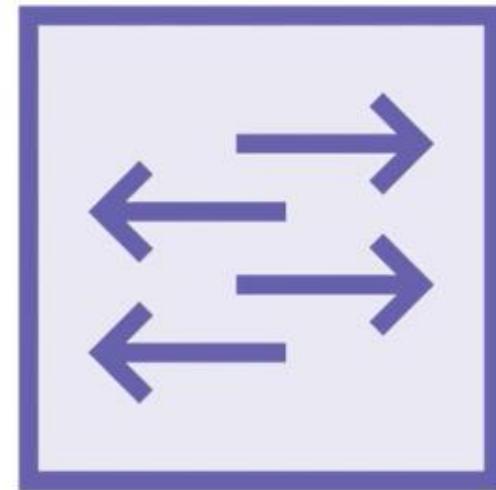
# Plan Phase



Purpose



Audience



Delivery



# Analyzing Your Audience

- Who will be reading it (demographics)?
- What do they already know?
- Why are they going to be reading it?
- In what environment will they be reading it?
- What is their state of mind?





ACK!

I just spilled hazardous waste!  
What am I supposed to do?



# Analyzing Your Audience

- Who will be reading it (demographics)?
- What do they already know?
- Why are they going to be reading it?
- In what environment will they be reading it?
- What is their state of mind?
- What do they NEED to know?
- What tone is appropriate?



Hi guys,

Welcome to the project! Here are the steps to set up your development environment.

1. Download and install Visual Studio from the file share
2. Connect to Team Foundation Server
  1. Server name: pharmaTFS
  2. Port: 8080
3. Do a “get” on the latest code base
4. Code up some awesomeness! ☺

Let me know if you have any questions.

Amber



# REFUEL A FIGHTER JET



# Writing Styles by Audience

Technical Level	Description	Users	Writing Style
Non-Technical	<ul style="list-style-type: none"><li>Novice user</li><li>No experience with the product or concept</li></ul>	<ul style="list-style-type: none"><li>Sales &amp; Marketing</li><li>Prospective clients</li><li>New team members</li></ul>	<ul style="list-style-type: none"><li>Step-by-step instructions</li><li>Definitions</li><li>Full explanations and details</li></ul>
Semi-Technical	<ul style="list-style-type: none"><li>Intermediate user</li><li>Some experience with the product or concept</li></ul>	<ul style="list-style-type: none"><li>Sales &amp; Marketing</li><li>Existing clients</li><li>Developers</li></ul>	<ul style="list-style-type: none"><li>Facts and figures</li><li>Brief explanations</li><li>Moderate amount of detail</li></ul>
Technical	<ul style="list-style-type: none"><li>Advanced user</li><li>Very experienced with product or concept</li></ul>	<ul style="list-style-type: none"><li>Developers</li><li>System admins</li><li>Testers</li></ul>	<ul style="list-style-type: none"><li>Limited definitions and amount of detail</li><li>Step-by-step instructions not necessary</li></ul>



What if I have more than  
one audience?



# PRIMARY AUDIENCE

Target reader

Requested the document

Often a decision maker



# PRIMARY AUDIENCE

Target reader  
Requested the document  
Often a decision maker

# SECONDARY AUDIENCE

May come into contact with the document  
But not the intended reader



You may have to create  
multiple documents



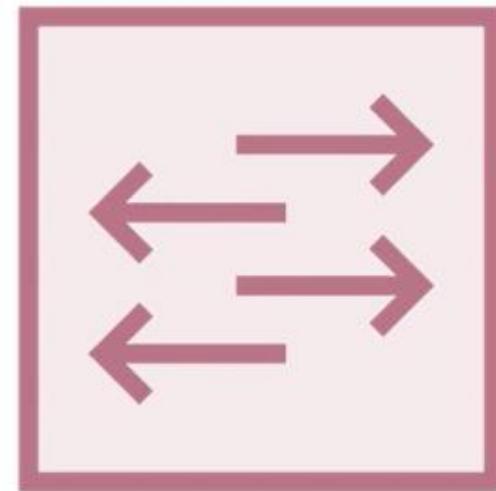
# Plan Phase



Purpose



Audience



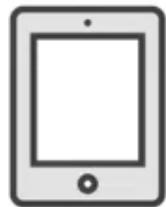
Delivery



# **Delivery:**

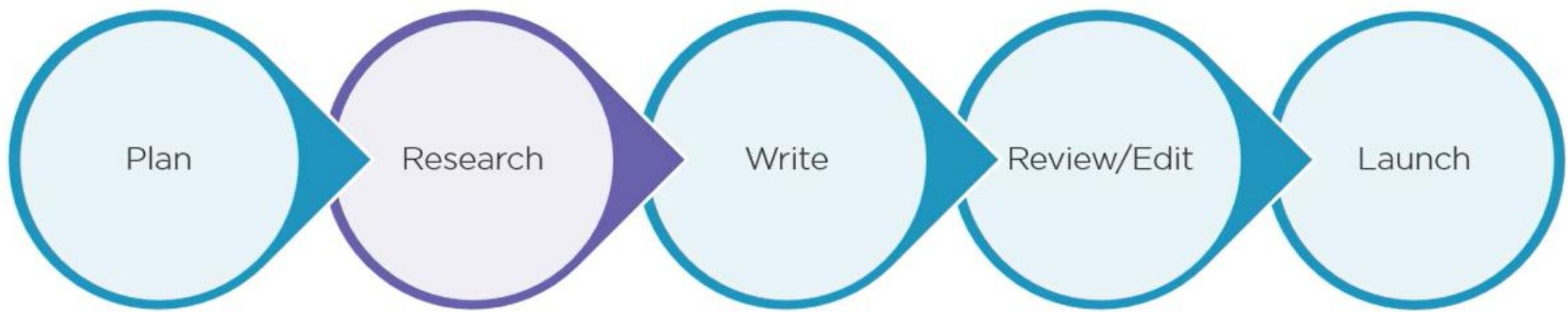
What's the best way to  
deliver the information to  
the audience?





Ummm...but we don't have  
reliable Internet service.





## **RESEARCH**

- Interview Subject Matter Experts (SMEs)
- Review Existing Documentation
- Use the Software



# Preparing for the SME Interview

## Prepare interview questions

- Who, what, when, where, why, how
- Open-ended
- Each question should focus on one thing

**Anticipate possible directions of the interview and think about your response (i.e., how you will get back on track)**



## Scheduling the SME Interview

**Decide if the interview will be recorded**

- Get permission

**Provide 2-3 timeslots of 60 minutes or less**

**Communicate high-level topic areas**

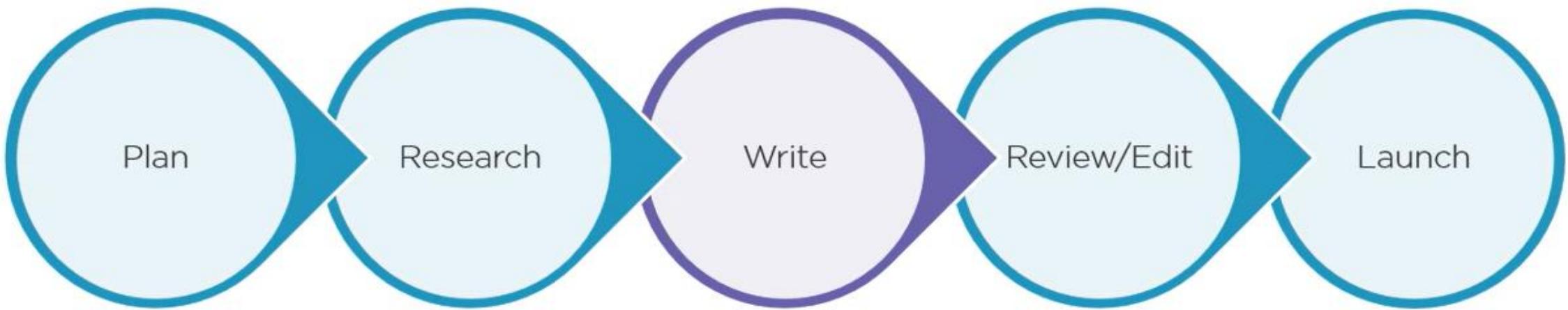
**Schedule in a conference room to minimize  
distractions**



# Conducting the SME Interview

- Start on time
- Build rapport with small talk
- Acknowledge expertise on both sides
- State goals and topics of the interview
- Be confident and relaxed
- Practice active listening
- Observe body language
- Tune out distractions
- Ask for additional thoughts before changing topics
- Review and confirm action items
- Thank them for their time





**1**

## **Organize your content and ideas**

(e.g., chronological, parts of an object, simple to complex, specific to general)

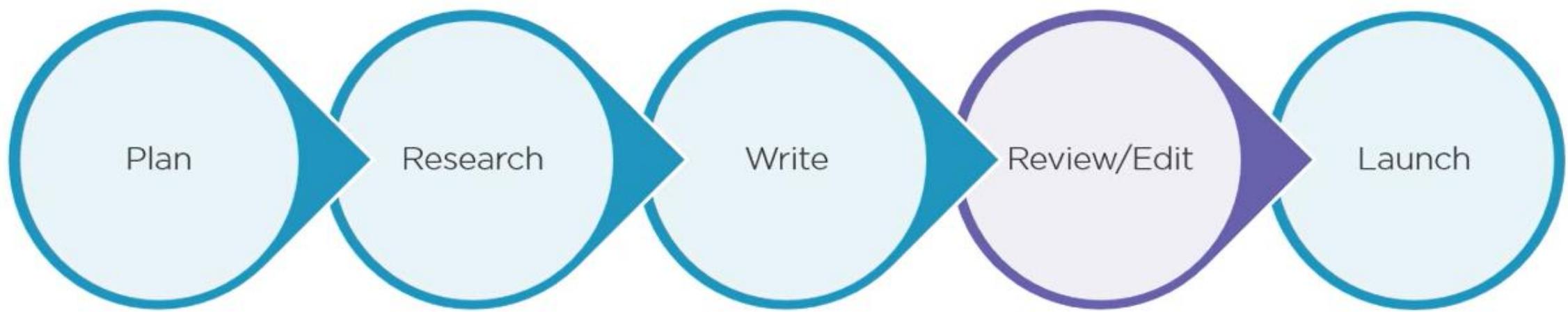
**2**

**Write the first draft**

**3**

**Review and revise**





## Purpose

Adjust and reorganize content

Editing for style

Editing for grammar and punctuation

Revise to incorporate test results



# Tips for Reviewing and Editing

Have someone  
else do it

Walk away

Read out loud

Print it  
out/change  
margins

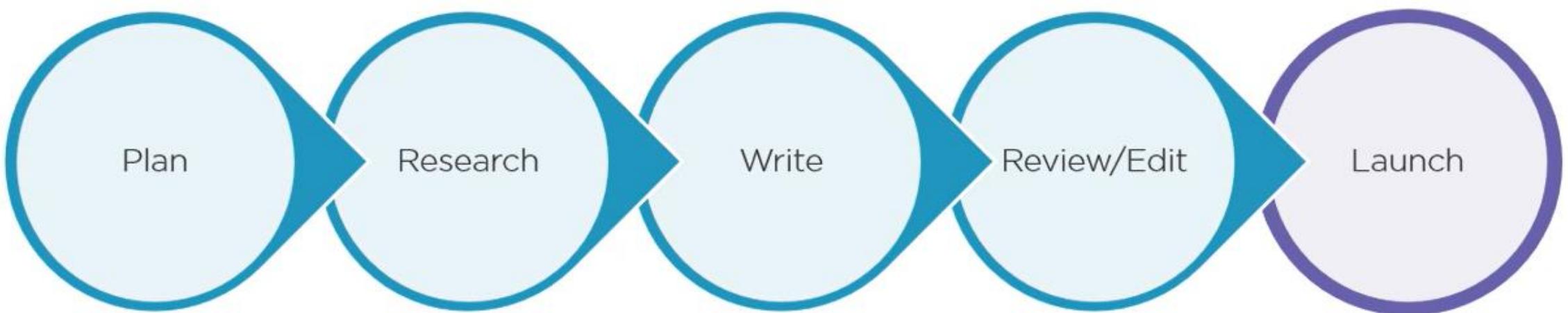
Edit with a  
knife



# Usability Testing

Line-by-line testing of a document to ensure it makes sense and the instructions work as expected





## Launch

- Handle translations, if applicable**
- Bundle up final deliverables (e.g., READMEs, web pages, PDFs, etc.)**
- Coordinate with development team and other writers to release (usually in conjunction with software)**
- Create a plan for updates**



# Summary



## Plan

- Purpose, Audience, Delivery

## Research

- Get the information out of the heads of the creators

## Write

- Get it on paper

## Review/Edit

- Recruit others to help
- Usability testing is key

## Launch!



# Style Guides

Set of standards for writing and designing documents



Here's one example...

# The Chicago Manual of Style Online

HOME | THE CHICAGO MANUAL OF STYLE | FORUM | CHICAGO STYLE Q&A | TOOLS | HELP

Table  
of Contents

List of Figures

List of Tables

Index

Go to ¶

GO ▶

Go to 15th Ed.

## Contents



Preface

Acknowledgments

### Part One: The Publishing Process

- 1 Books and Journals
- 2 Manuscript Preparation, Manuscript Editing, and Proofreading
- 3 Illustrations and Tables
- 4 Rights, Permissions, and Copyright Administration by William S. Strong

### Part Two: Style and Usage

- 5 Grammar and Usage by Bryan A. Garner
- 6 Punctuation
- 7 Spelling, Distinctive Treatment of Words, and Compounds
- 8 Names and Terms
- 9 Numbers
- 10 Abbreviations
- 11 Foreign Languages
- 12 Mathematics in Type
- 13 Quotations and Dialogue

### Part Three: Documentation

- 14 Documentation I: Notes and Bibliography
- 15 Documentation II: Author-Date References
- 16 Indexes

Appendix A: Production and Digital Technology

Appendix B: Glossary

Bibliography

Index



# Style Guides

## **The Chicago Manual of Style**

- History and social science

## **Modern Language Association (MLA)**

- Literature, media, culture publications

## **American Psychological Association (APA)**

- Scientific

## **Others**

- Microsoft Manual of Style
- Associated Press
- New York Times



# Writing Tips and Best Practices

**Accuracy**

**Clarity**

**Conciseness**

**Tone**

**Tense**

**Grammar, Spelling and Terminology**



# Accuracy

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“Fast is fine, but accuracy is everything.”

**Wyatt Earp**



# Aspects of Accuracy

**Document  
Accuracy**

**Stylistic  
Accuracy**

**Technical  
Accuracy**



# Document Accuracy

Document  
Accuracy

Stylistic  
Accuracy

Technical  
Accuracy

Contains proper coverage of topics in appropriate detail

Focuses clearly on a problem or solution

Solves a theoretical or practical problem



# Stylistic Accuracy

Document  
Accuracy

Stylistic  
Accuracy

Technical  
Accuracy

Careful use of  
language to  
express  
meaning

Words are used  
precisely

Paragraph and  
sentence  
structure  
describe and  
analyze topics  
effectively



# Technical Accuracy

Document  
Accuracy

Stylistic  
Accuracy

Technical  
Accuracy

Grounded in  
technically  
accurate  
understanding  
and  
representation  
of the subject

Depends on the  
writer's  
conceptual  
mastery of the  
subject

Data is  
analyzed and  
shaped with  
minimum  
distortion



# Tips to Increase Accuracy



**Consult Subject Matter  
Experts (SMEs)**



**Conduct usability  
testing**



**Proofread**



# Clarity

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“Clarity affords focus.”

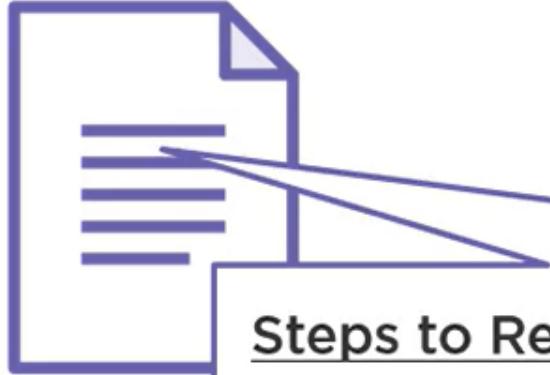
Thomas Leonard



# Clarity

Ease of understanding





## Steps to Reimage Your Laptop

1. Download and install the DoesEverything tool
  - a. Navigate to [www.installURL.com](http://www.installURL.com)
  - b. Enter your enterprise ID and password
  - c. Press Next to start the installation of DoesEverything

**NOTE:** You need to run this with an account that has administrator privileges



# Aspects of Clarity

**Structural  
Clarity**

**Stylistic  
Clarity**

**Contextual  
Clarity**



# Tips to Increase Structural Clarity



Abstracts  
Introductions  
Statement of Purpose

Table of Contents  
Problem Statements

Graphs  
Tables  
Descriptive titles and headings



Which is more clear?

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**Pharmalanta**  
Project Charter

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**Table of Contents**

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**Purpose of Document**

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**Project Stakeholders**

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**Market Research  
Supporting the Project**

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# Tips to Increase Stylistic Clarity



Be specific

Be active  
(in voice)

Be strong



# Be Specific

Pharmacists will configure the patient's account through the ***application***.

What application? The mobile app?  
Website? Desktop application?



But generally speaking,  
avoid using passive voice

# Be Strong. And Say What You Mean.

## Weak: Bad

make an assumption

is a function of/is contingent upon

is an illustration

is a requirement

utilizes

had a difference

there is a risk that

not known

## Strong: Good

assume

depends on

illustrates, shows

requires, needs to

uses

differed

sometimes

unknown



# Tips to Increase Contextual Clarity



State the purpose

What precedes this document?

How does this document relate to others?



# Conciseness

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“The best sentence? The shortest.”

Anatole France



# Conciseness

Conveys only the needed material



# Tips to Increase Conciseness

Have a clear focus from the start

Eliminate material and words not necessary to support your claims

Use visuals rather than words



## Quick Start, Installation and Troubleshooting Guide



Quick Start, Installation and  
Troubleshooting Guide



# Unnecessary Repetition

## Repetitive: Bad

minimum of at least

maximize as much as possible

small in size

actual facts

orange in color

previous history

In other words

## Concise: Good

minimum of

maximize

small

facts

orange

history

Just say it well the first time!



# Use short sentences

15-20 words in print

10-15 words online



# Tone

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# Tone

Attitude of a writer toward a subject or an audience



But here are my  
suggestions



# Be Conversational

Write the way you talk



# Be Personable

Show some personality



# Tense

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# Tense

Verb forms that indicate time distinctions



# Common Tenses Used in Technical Writing

## Present

Example:

- Select the country from the dropdown box
- Click the Next button
- Enter your credit card number

## Future

Example:

- First, you'll need to install version 8 of the SDK
- When that's complete, restart your computer



Regardless of tense, stay  
consistent

Before she saved the new contact information,  
she scans the screen for mistakes.

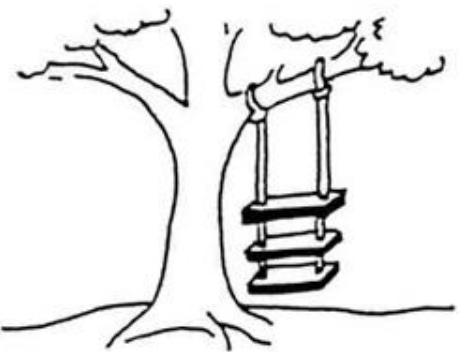


# Poor Requirements = Project Failure

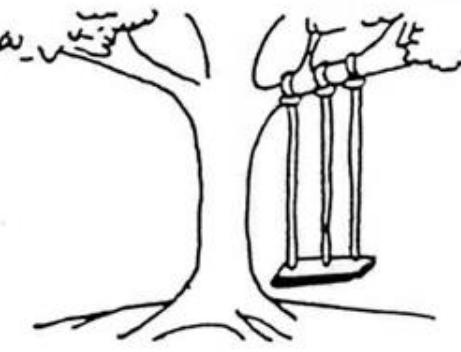
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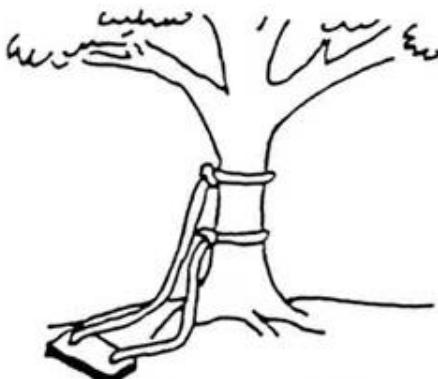
## **“Problem solving is an art form not fully appreciated by some”**



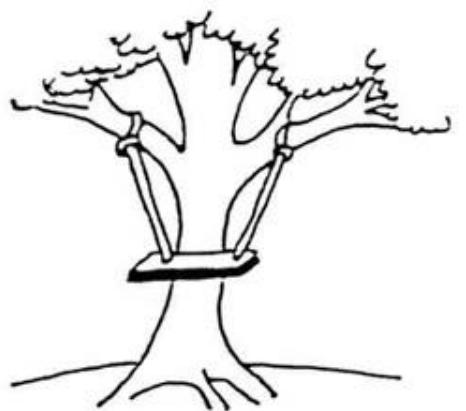
*As proposed by  
the project sponsors*



*As specified in  
the project request*



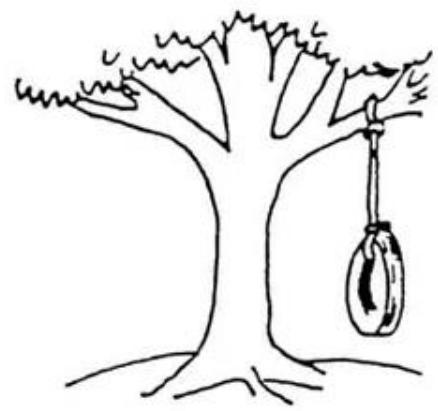
*As designed by  
the senior analyst*



*As produced by  
the programmers*



*As installed at  
the user's site*



*What the user  
wanted*

Tree Swing graphic by S Høgh 1993 - from [Businessballs.com/treeswings.htm](http://Businessballs.com/treeswings.htm) 2013



# Standish Group 2015 CHAOS Report

	2011	2012	2013	2014	2015
<b>SUCCESSFUL</b> <small>(on time, on budget, with satisfactory result)</small>	29%	27%	31%	28%	29%
<b>CHALLENGED</b>	49%	56%	50%	55%	52%
<b>FAILED</b>	22%	17%	19%	17%	19%

Source: Standish Group 2015 CHAOS Report



Project Challenged Factors	% of Responses
1. Lack of User Input	12.8%
2. Incomplete Requirements & Specifications	12.3%
3. Changing Requirements & Specifications	11.8%
4. Lack of Executive Support	7.5%
5. Technology Incompetence	7.0%
6. Lack of Resources	6.4%
7. Unrealistic Expectations	5.9%
8. Unclear Objectives	5.3%
9. Unrealistic Time Frames	4.3%
10. New Technology	3.7%
Other	23.0%

Source: Standish Group 2015 CHAOS Report

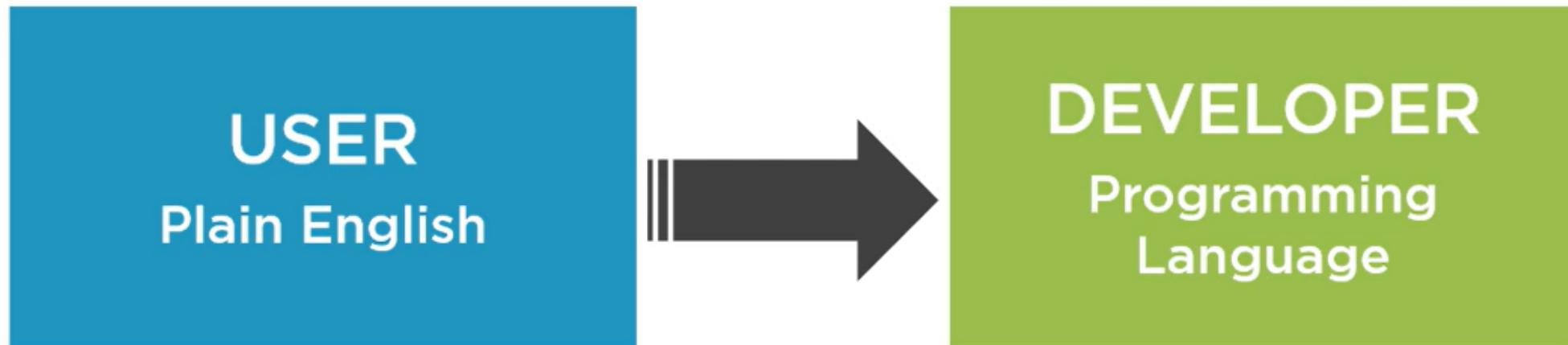


# Why Software Projects Fail

- Unrealistic or unarticulated project goals
- Inaccurate estimates of needed resources
- **Badly defined system requirements**
- Poor reporting of the project's status
- Unmanaged risks
- Poor communication among customers, developers, and users
- Use of immature technology
- Inability to handle the project's complexity
- Sloppy development practices
- Poor project management
- Stakeholder politics
- Commercial pressures



# Requirements = Translation



<b>Unitary (Cohesive)</b>	Addresses one and only one thing
<b>Complete</b>	Fully stated in one place, with no missing information
<b>Consistent</b>	Does not contradict any other requirement; fully consistent with all authoritative external documentation
<b>Atomic</b>	Does not contain conjunctions “Validate fields A and B” becomes 1) “Validate field A” 2) “Validate field B”
<b>Traceable</b>	Meets all or part of a business need as stated by stakeholders and is authoritatively documented
<b>Current</b>	Has not been made obsolete by the passage of time
<b>Unambiguous</b>	Concisely stated without use of jargon, acronyms or esoteric verbiage; expresses objective facts; subject to one interpretation
<b>Specify Importance</b>	Specifies a level of importance (defined by stakeholders, time or budget)
<b>Verifiable</b>	Implementation can be determined through inspection, demonstration, test or analysis



# The User and System Perspectives

## User's Perspective

**User type:** "The [user class or actor name]..."

**Result type:** "...shall be able to [do something]..."

**Object:** "...[to something]."

**Qualifier:** [response time goal or quality objective]

### Example:

The pharmacist shall be able to send an opt-in notification to the patient [within 2 clicks]

## System's Perspective

**Conditions:** "When [some conditions are met...]"

**Result:** "...the system shall [do something]."

**Qualifier:** [response time goal or quality objective]

### Example:

When a new notification is saved to the database, the system shall send an SMS message [within 30 seconds]



# Requirement Writing Styles

User Stories

Traditional  
(Text-Based)

Use Cases

# Requirement Types

Business

User  
(Stakeholder)

Functional

Non-Functional

Interface

## Format

<Subject doing the action> <auxiliary verb> <capability or functionality to be provided> <criterion that limits or further explains requirement (optional component)>

## Examples

<**The Company**> <**shall**> <**develop an SMS notification system**> enabling patients to <**receive alerts when their prescriptions are available to pick up**>

<**The Pharmalantalert system**> <**shall**> provide the ability to <**enroll patients in a notification service**>

## Benefits

Can be used to capture complete requirements early in the project



# Auxiliary Verbs According to IEEE

Word	Indicates
► Shall	Mandatory requirements; implies “ <i>is required to</i> ”
Should	Preferred possibility among several; implies “ <i>is recommended that</i> ”
May	A permissible course of action; implies “ <i>is permitted to</i> ”
Can	Used for statements of possibility and capability; implies “ <i>is able to</i> ”
Must	Only used to describe unavoidable situations (not mandatory requirements); implies “ <i>is a natural consequence of</i> ”
Will	Only used in statements of fact (not mandatory requirements); implies “ <i>it is true that</i> ”



# Use Case

A list of actions or event steps, typically defining interactions between an actor and a system, to achieve a goal



## Format

<b>Use Case Number:</b>	A unique identifier for this use case
<b>Title:</b>	An active-verb goal phrase that names the goal of the primary actor
<b>Description:</b>	Brief description and purpose of use case
<b>Actors:</b>	All actors involved in the use case, both primary and secondary
<b>Scope:</b>	Name of system or subsystem defined by the use case
<b>Priority:</b>	How important is this requirement?
<b>Assumptions:</b>	Any conditions presumed to be true
<b>Preconditions:</b>	State the system must be in for the use case to proceed
<b>Postconditions:</b>	Changes in the environment as a result of the use case
<b>Trigger:</b>	What causes this use case to run
<b>Main Success Scenario:</b>	Step-by-step walk through the use case



## Example

<b>Use Case Number:</b>	UC-2.1.5
<b>Title:</b>	Receive and acknowledge notification to opt in to the program
<b>Description:</b>	The patient receives an SMS on their cell phone, indicating they have been successfully enrolled. Upon receipt, the patient replies with a message indicating they accept.
<b>Actors:</b>	Patient
<b>Scope:</b>	Pharmalantalert patient SMS
<b>Priority:</b>	Essential
<b>Assumptions:</b>	Patient is able to receive SMS messages
<b>Preconditions:</b>	A valid phone number for the patient is stored in the system
<b>Postconditions:</b>	Patient has fully enrolled in the program with a double opt-in
<b>Trigger:</b>	Pharmacist enrolls the patient in the notification program







