

# CMP5354

## Software Design

### Requirements Engineering

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- +RequirementTypes:List(String)
- +RequirementEngineeringDefinition:String
- +RequirementEngineeringActivities:List<String>
- +RequirementEngineeringTechniques:List(String)
- +Documentation:HashMap<String>

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### Ethical/ Legal Issues

- +EthicandLegalIssuesDefinition:String
- +Documentation:HashMap<String>

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### Risk Assessment

- +RiskDefinition:String
- +RiskMitigationDefinition:String
- +RiskAssessmentDefinition:String
- +RiskAssessmentAcitivities:List<String>
- +RiskAssessmentTechniques:List<String>
- +Documentation:HashMap<String>

## RequirementsDefinition

***A statement of a system's service or constraints.***

# Linking Requirements to Final Year Project/Assessment Case Studies

## Project Details #520006



**Title:** Artificially Intelligent Journalist

**Topic Areas:** Artificial Intelligent, Natural Language Processing

**Tags:** IBM

**Business Case:** Fake news is a big problem and users are losing the ability to trust pieces of content they read online or in the media. Users can often be influenced by articles that play on emotional triggers or portray certain entities/characters in a certain way. For an end user, it can be difficult to see a balanced view of the news surrounding a particular topic and news platforms such as Facebook wish to remain impartial on the content they display.

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**Technologies:** Within your research explore and discuss available alternative technologies in addition to the recommended ones.

- Watson Semantic Analysis [Recommended]
- Azure Text Analysis [Alternative]
- Amazon Comprehend [Alternative]

### Skills Needed:

- Semantic Feature Analysis
- Natural Language Processing
- AI Modelling

**Which sub-section(s) in this brief can be considered a requirement?**

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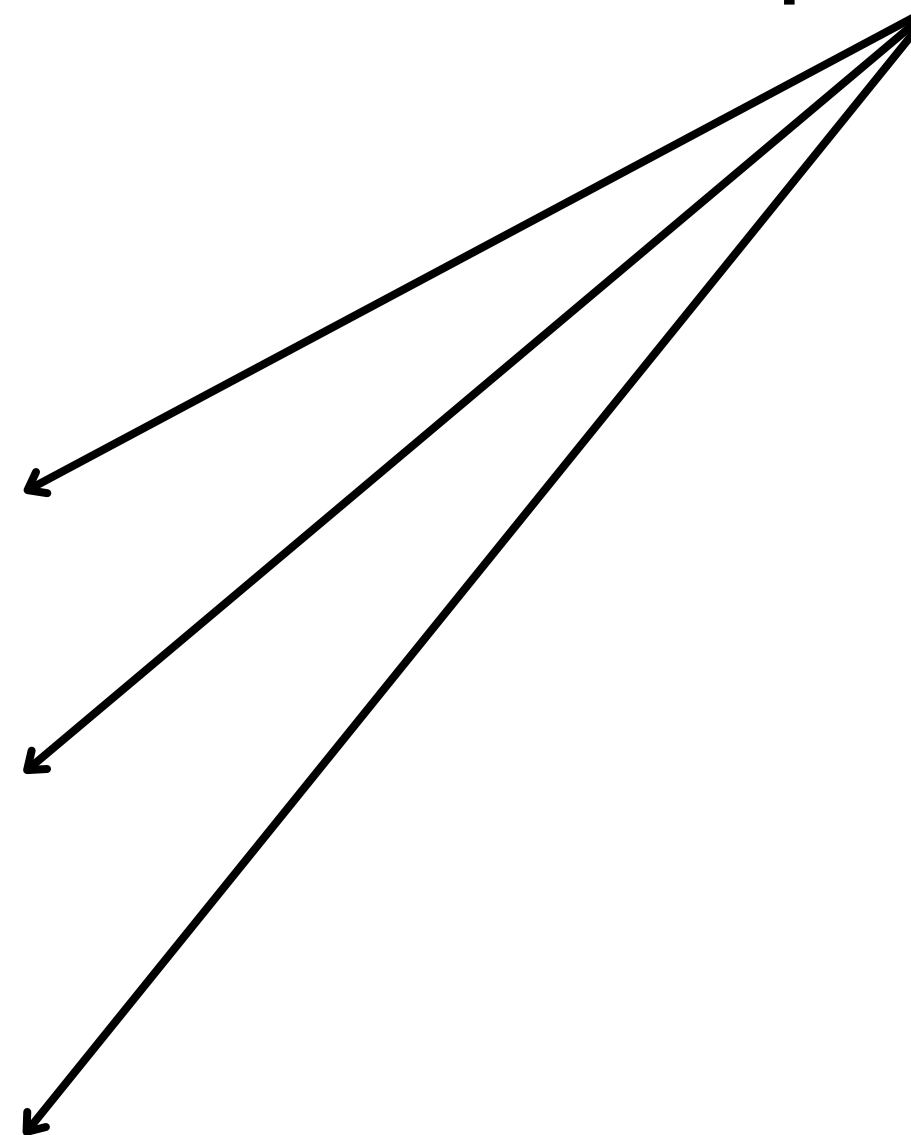
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# RequirementTypes

# Functional vs. Non-functional Requirements

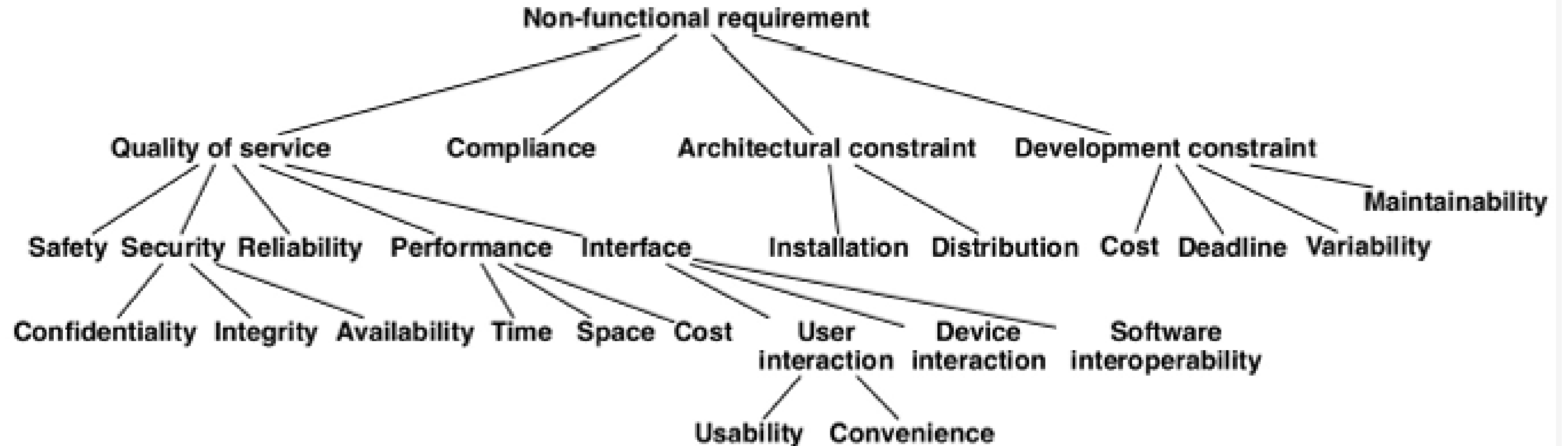
## Functional Requirements

- **What the system should do**
- The expected **input, processing, and output** from the system.
- Detail how the system **interacts with users and other systems**, including specific workflows, sequences of operations, or system states in response to user actions.

## Non-functional Requirements

- **Constraints or qualities the system must meet**, such as performance, security, or usability, which do not directly relate to specific functions but impact how the system performs
- **Constraints on the development process or operational environment**, such as platform compatibility, legal regulations, or compliance with industry standards.

# Common Constraints and Qualities



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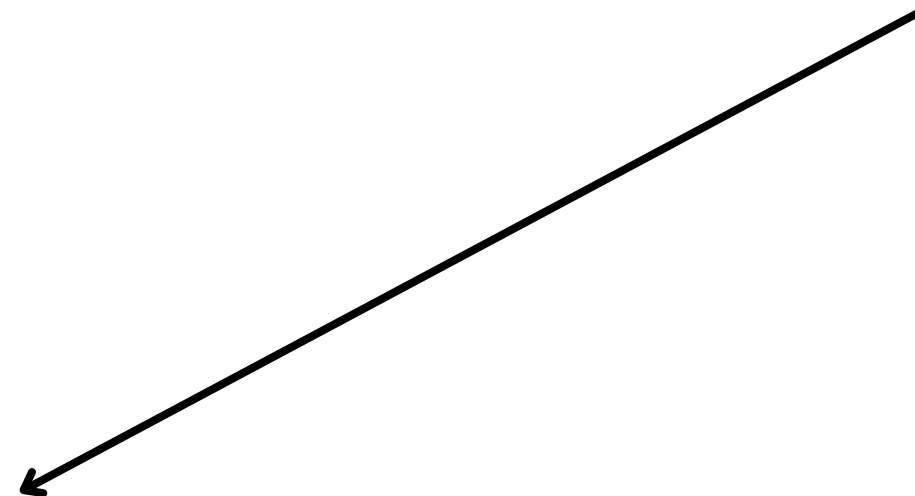
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# Linking Non-functional Requirements to Final Year Project/Assessment Case Studies

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**Which sub-section(s) in this brief can be considered non-functional requirements?**

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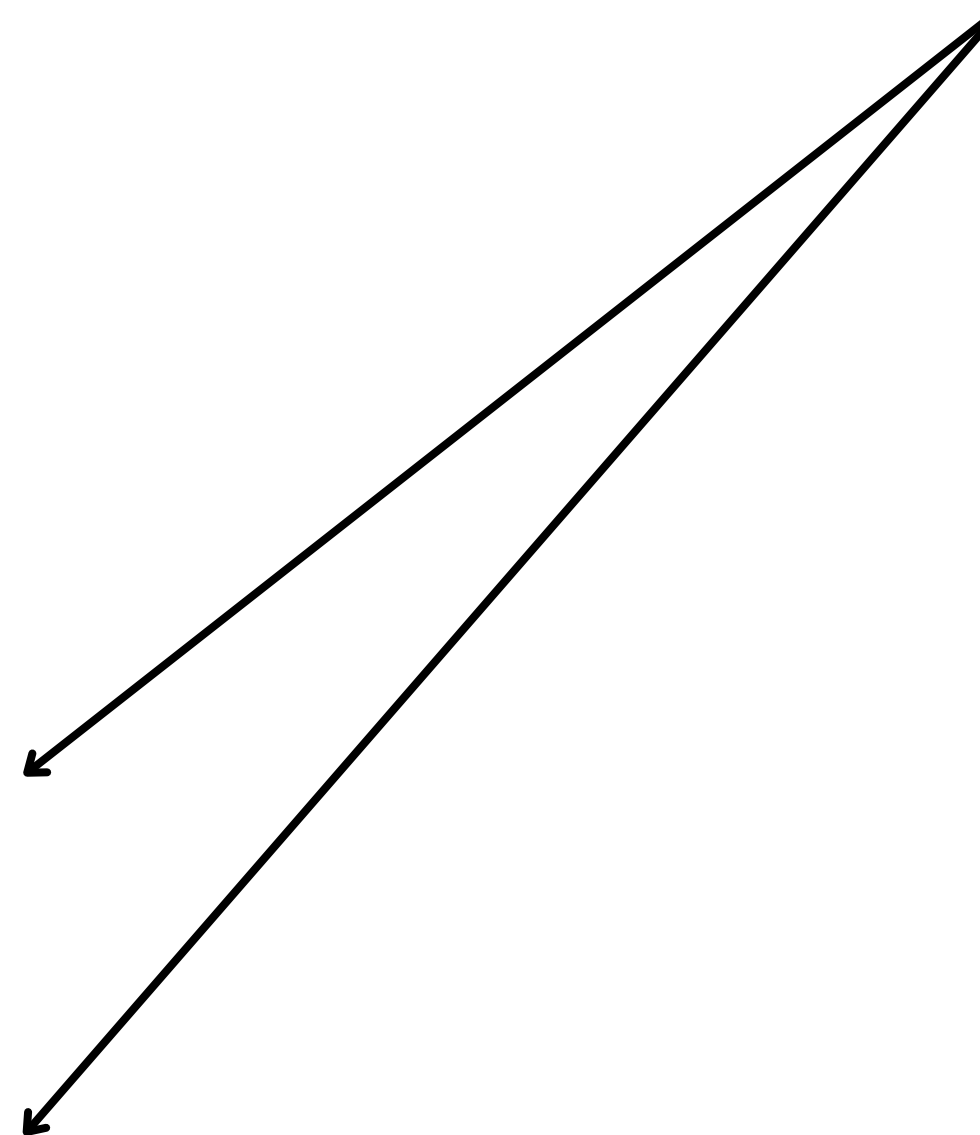
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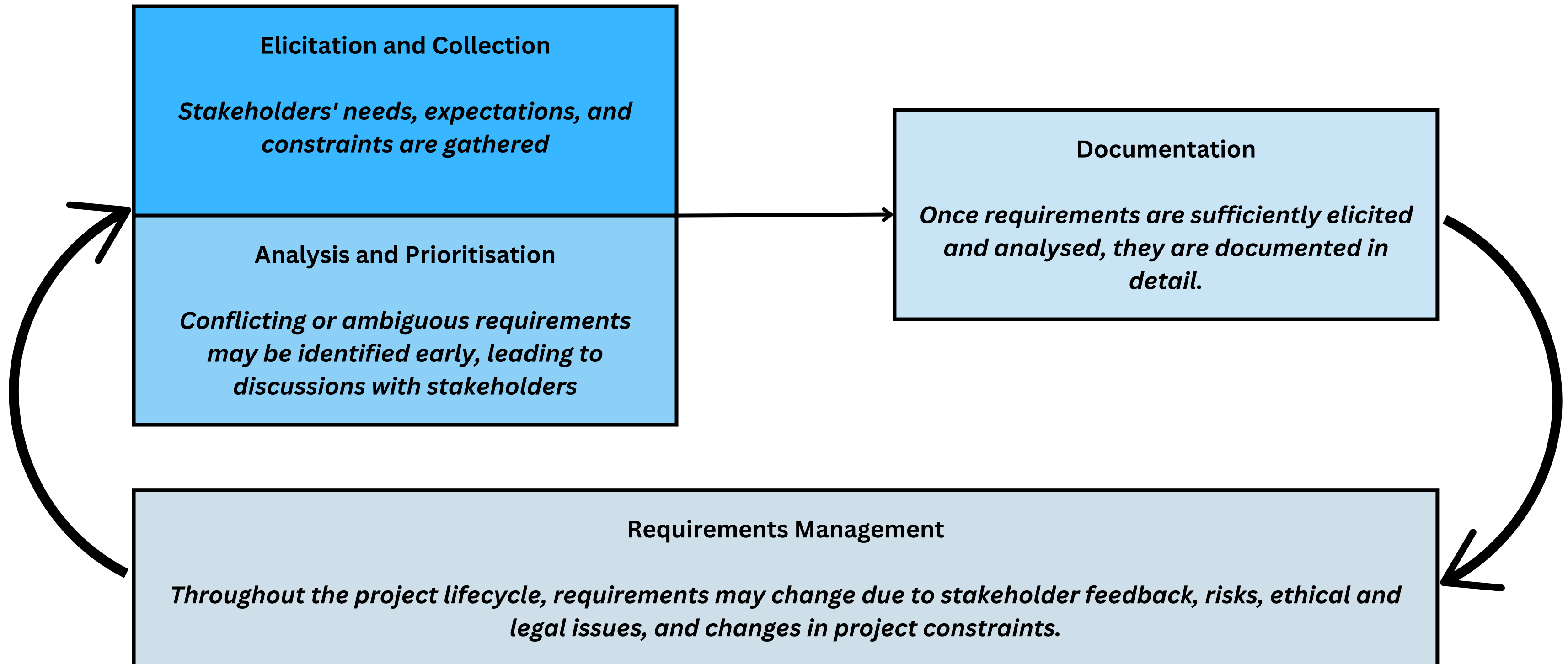
Which sub-section(s) in this brief can be considered non-functional requirements?



## RequirementEngineeringDefinition

***The process of defining, documenting, and maintaining the requirements to ensure that the final product or system meets the stakeholders' expectations and project goals.***

# Requirement Engineering Activities

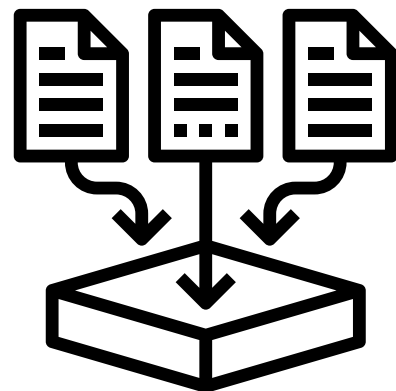


# RequirementEngineeringTechniques

# Collection-based vs. Analysis-based Techniques

## Collection-based Techniques

- Interviews
- Workshops
- Surveys and Questionnaires
- Job Shadowing
- Focus Groups
- Brainstorming



## Analysis-based Techniques

- Prototyping
- Document Analysis
- Use Cases and User Stories
- Benchmarking



# Documentation - RequirementTables



# Functional Requirement Table

<u>Functional Requirement ID</u>	<u>Functional Requirement Description</u>
FR1	The system must display a clear, balanced breakdown of articles providing ‘for’ and ‘against’ perspectives on any news topic
FR2	The system must highlight articles designed to evoke strong emotional reactions, allowing users to be more aware of manipulative content.
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FR3	The system must provide concise summaries of the key points for/against on specific topics for users who want quick insights without reading full articles
FR4	The system allow users to create accounts and it must store and manage user account information securely.

## Tips for Functional Requirements:

- Each requirement must be implementable.
- Do not write the overall aim of the system as a single requirement.

# Non-functional Requirement Table

<u>Non-functional Requirement ID</u>	<u>Non-functional Requirement Description</u>
NFR1	The system must yield search results for articles within 3 milliseconds of pressing the search button.
NFR2	The system must only yield articles that are published in official news outlets.
NFR3	The system must comply with Data Protection Act requirements when storing user information.

**Tips for Non-functional Requirements:**

- Each requirement must be measurable.
- Ensure the requirement is relevant to the specific system.

## EthicalIssuesDefinition

***Ethical Issues: responsibilities of software engineers to act in the public interest, avoid harm, and maintain integrity and professionalism in their work.***

## LegalIssuesDefinition

***Legal Issues: ensuring that systems do not violate intellectual property rights, privacy, or industry-specific regulations.***

# Linking Ethical and Legal Issues to Final Year Project/Assessment Case Studies

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### Skills Needed:

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**What are possible ethical and legal issues related to this brief?**

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## What are possible ethical and legal issues related to this brief?

- Bias and Fair Representation
- Misinformation and Quality Control
- Data Protection Act Infringement

# Linking Ethical and Legal Issues to Functional Requirements

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- Bias and Fair Representation -- **FR1**
- Misinformation and Quality Control -- **FR1, FR3**
- Data Protection Act Infringement -- **FR4**
- Copyright Law Infringement -- **FR1**

# Linking Ethical and Legal Issues to Non-functional Requirements

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- Bias and Fair Representation -- **NFR2**
- Misinformation and Quality Control -- **NFR2**
- Data Protection Act Infringement -- **NFR3**
- Copyright Law Infringement -- **NFR2**



# Documentation -- Ethical and Legal Issue Tables

# Ethical and Legal Issues Table

<u>Issue ID</u>	<u>Issue Description</u>	<u>Issue Justification</u>	<u>Related Requirement ID</u>
E1	Bias and Misrepresentation	The algorithm or the developers may prioritize certain sources or perspectives, leading to unfair representation of one side.	FR1, NFR2
E2	Misinformation and Quality Control	Avoiding the spread of misleading or false information, especially on controversial topics.	FR1, FR3, NFR2
L1	Data Protection Act Infringement	Legal implications for the system if users' information is leaked.	FR4, NFR3
L2	Copyright Law Infringement	Legal implications for the system if articles are published on the platform in violation to the authors'/publishers copyrights.	FR1, NFR2

Tips for Issues table:

- Justification is significance of problem, not solution to it.
- E for Ethical, L for legal in IDs.
- Justifications have to be relevant to the case study.

## RiskDefinition

***A concern that may affect the success of a software project or the quality of the software product.***

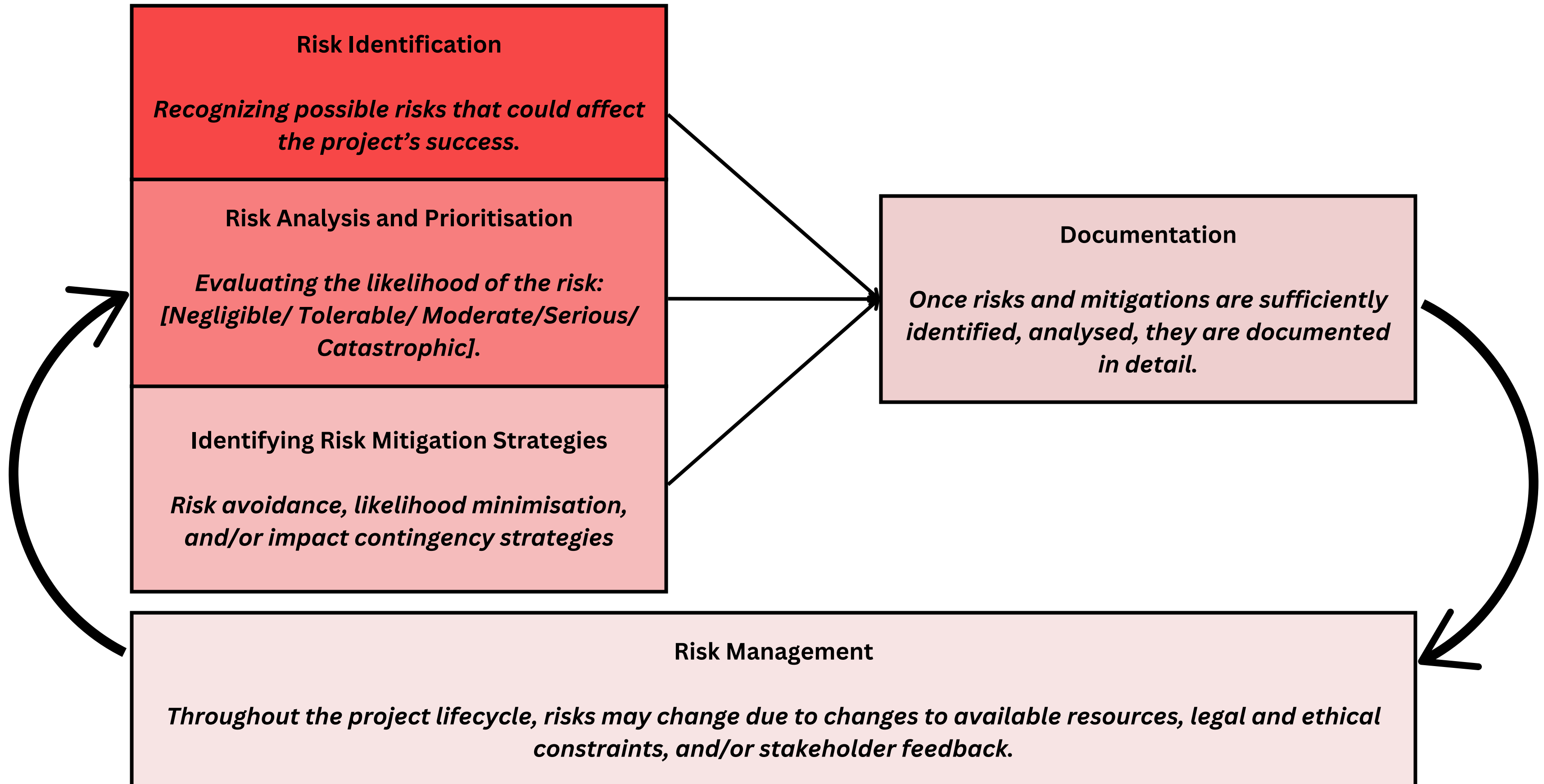
## RiskMitigationDefinition

*The process of reducing the impact of a risk by taking early action to minimize the likelihood of the risk occurring or to reduce its impact if it does occur.*

## **RiskAssessmentDefinition**

***The process of identifying the risks that could affect a project, analyzing the likelihood of these risks occurring, and assessing the potential impact they would have on the project.***

# Risk Assessment Activities



# Linking Risk Assessment to Final Year Project/Assessment Case Studies

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**What are possible risks related to this brief?**

# Linking Risk Assessment to Final Year Project/Assessment Case Studies

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## What are possible risks related to this brief?

- Content Aggregation Failure
- Balancing Algorithm Malfunction
- Cross-Platform Compatibility Issues



# Linking Risk Assessment to Functional Requirements

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- Content Aggregation Failure -- **FR1**
- Balancing Algorithm Malfunction -- **FR1**
- Cross-Platform Compatibility Issues -- **to be updated**

# Linking Risk Assessment to Non-functional Requirements

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- Content Aggregation Failure -- **to be updated**
- Balancing Algorithm Malfunction -- **to be updated**
- Cross-Platform Compatibility Issues -- **to be updated**

# Documentation -- Risk Assessment Table

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<u>Risk ID</u>	<u>Risk Description</u>	<u>Risk Category</u>	<u>Risk Mitigation Strategy</u>	<u>Related Requirement ID</u>
Ri1	The system may fail to reliably aggregate articles from multiple publishers leading to incomplete or inaccurate content presentation	Negligible/ Tolerable/ Moderate/ Serious/ Catastrophic	Ensure the use of standardized APIs or build middleware to handle data conversion across different formats.	FR1
Ri2	The algorithm designed to provide a balanced "for/against" view might fail to properly rank articles, resulting in biased or skewed content delivery.		Conduct extensive testing of the balancing algorithm with a variety of datasets.	FR1
Ri3	The system could experience failures in displaying content uniformly across different devices and platforms (e.g., web, mobile), leading to inconsistent user experiences or poor accessibility.		Utilize automated testing tools and real-device testing environments to verify the system's performance across different platforms	?

Tips for risk assessment table:

- Description needs to be a problem not a solution.
- Related requirement ID should be relevant to the specific risk.