

## Academic Affairs System - Lab 4

### Group Members

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### Tasks

#### 1) Tools, Technologies and Frameworks

##### Tools:

- a) **VS Code:** We will be using VS Code for collaborative development of the web application as it will help us in easy code writing.
- b) **Github Copilot:** Using Github Copilot, the team will be able to easily write code and use AI powered technology for implementation of various features of the website.
- c) **Git:** Git will allow every individual to have local version control of various files of code that will be used in development of the website.
- d) **Github:** With the help of Github, it will be easier for tracking and handing the code of different versions of the application

##### Frameworks:

- a) **Bootstrap:** Bootstrap will allow to create a dynamically responsive website and will provide basic templates for designing of the websites
- b) **Node:** Node will be used as a backend framework for the website and will allow the integration of MongoDB and Express.
- c) **Express:** The express framework will allow for multiple page routing on the website.

##### Technologies:

- d) **HTML :** HTML is the basic technology we will be using in order to create our website.

- e) **CSS:** Using CSS for the web application will allow us to create an interactive and user friendly interface.
- f) **Javascript:** Javascript will be used in order to create dynamically interactive features as well as media control.
- g) **MongoDB:** For storing the data which will be used in the application, we will be using MongoDB as it is a NoSQL database program which will be integrating well with our backend framework.

## 2) User stories and Functional point analysis

### Unadjusted Use Case Weight (UUCW):

Actor Complexity	Actor weight	Number of Use Cases	Product
Simple	5	6	30
Average	10	2	20
Complex	15	4	60

UUCW = (Total No. of Simple Use Cases x 1) + (Total No. Average Use Cases x 2) + (Total No. Complex Use Cases x 3)

UUCW - 110

### Unadjusted Actor Weight (UAW)

Actor Complexity	Actor Weight	Number of Actors	Product
Simple	1	1	1 × 1
Average	2	1	2 × 1
Complex	3	1	3 × 1

$$\text{UAW} = (\text{Total No. of Simple actors} \times 1) + (\text{Total No. Average actors} \times 2) \\ + (\text{Total No. Complex actors} \times 3)$$

$$\text{UAW} = 6$$

## Technical Complexity Factor (TCF)

Estimated size of the software in order to account for technical considerations of the system.

Factor	Description	Weight (W)	Rated Value (0 to 5) (RV)	Impact (I = W × RV)
T1	Distributed System	2.0	1	2
T2	Response time or throughput performance objectives	1.0	3	3.0
T3	End user efficiency	1.0	2	2.0
T4	Complex internal processing	1.0	3	3.0
T5	Code must be reusable	1.0	1	1.0
T6	Easy to install	0.5	3	1.5
T7	Easy to use	0.5	4	2.0
T8	Portable	0.5	4	2.0
T9	Easy to change	1.0	3	3.0
T10	Concurrent	1.0	1	1.0

T11	Includes special security objectives	1.0	1	1.0
T12	Provides direct access for third parties	0.5	1	0.5
T13	Special user training facilities are required	1.0	3	3.0

**Total Technical Factor (TF) = Sum of Impact of all the Factors**  
**= 25**

**TCF (Technical Complexity Factor) =  $0.6 + (0.01 \times TF)$**   
**= 0.85**

## Environmental Complexity Factor (ECF)

Estimated size of the software in order to account for environmental considerations of the system.

Factor	Description	Weight (W)	Rated Value (0 to 5) (RV)	Impact (I = W × RV)
E1	Familiar with the development process	1.5	3	4.5
E2	Application experience	0.5	2	1
E3	Object-oriented experience	1	3	3
E4	Lead analyst capability	0.5	4	2
E5	Motivation	1	5	5
E6	Stable requirements	2	4	8
E7	Part-time staff	-1	0	0
E8	Difficult programming language	-1	2	-2

**Total EFactor (EF)** = Sum of impact of all the factors

$$= 21.5$$

$$\begin{aligned}\text{ECF (Environmental Complexity Factor)} &= 1.4 + (-0.03 \times \text{EF}) \\ &= 1.4 + (-0.03 \times 21.5) \\ &= 1.4 - 0.645 \\ &= 0.755\end{aligned}$$

### **UCP ( Use Case Points) :**

UCP are the adjusted use case points.

$$\text{UCP} = (\text{UUCW} + \text{UAW}) \times \text{TCF} \times \text{ECF}$$

$$\text{UCP} = (110 + 6) \times 0.85 \times 0.755$$

$$\text{UCP} = 74.443$$

- **Approximately considering 4 man hours per use case point will be used**
  - **Estimated Effort** = UCP x Hours  
= 298 (approximately)

### **References:**

[https://en.wikipedia.org/wiki/Use\\_case\\_points](https://en.wikipedia.org/wiki/Use_case_points)