



IT314 - Lab 4

Grp : 30

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1. Tools and Technologies

1. Front End

We are planning to use HTML, CSS and JavaScript for the front end. Also we would use bootstrap as a designing framework. Together, these technologies provide a powerful set of tools for creating engaging and responsive online experiences.

2. Back End

For backend development, we are planning to use Django, a framework based on Python. It has many advantages such as simplicity, flexibility, reliability, scalability and a powerful REST framework. Django also provides an auto-generated admin interface that allows users to manage websites easily.

3. DataBase

We are implementing MongoDB as a NoSQL database since it employs JSON, a dynamic, adaptable format, to store data which might vary in structure. Scalability and high availability are features of MongoDB. Large amounts of geographical data may be handled using the NoSQL database MongoDB. It has geographical indexing and querying features that make it possible to quickly retrieve location-based data. Moreover, MongoDB is simple to combine with a number of mapping frameworks and utilities. Also, it has an integrated authentication system for safe access. Moreover, it offers cloud storage of data.

4. IDE

We are planning to use an open-source IDE namely Visual Studio Code integrated with Github Co-pilot.

5. Any Open Source Map API

To fetch data regarding crime and hazard we would use any open source map API. This API will help us to show the statistics on maps based on their location.

2. Effort Estimation

1. Calculate Unadjusted Use-Case Points

1.1. Determine Unadjusted Use-Case Weight (UUCW)

Use - Case	Transactions	Complexity
Login / Logout	1	Simple
Register	1	Simple
Display Filters	2	Simple
View on Map / Graph	2	Simple
Search	1	Simple
View Percentile	1	Simple
View Other Statistics	3	Simple
Post an Incident	4	Average
Voting For Post	4	Average
Add / Delete / Update Data	2	Simple

Use-Case Complexity	Use-Case Weight	Number of Use-Cases	Product
Simple	5	8	$5 \times 8 = 40$
Average	10	2	$10 \times 2 = 20$
Complex	15	0	$15 \times 0 = 0$
Unadjusted Use-Case Weight (UUCW)			60

1.2. Determine Unadjusted Actor Weight (UAW)

Actors	Complexity
User	Complex
Admin	Complex
Database	Simple

Actor Complexity	Actor Weight	Number of Actors	Product
Simple	1	1	$1 \times 1 = 1$
Average	2	0	$2 \times 0 = 0$
Complex	3	2	$3 \times 2 = 6$
Unadjusted Actor Weight (UAW)			7

1.3. Calculate Unadjusted Use-Case Points

$$\text{Unadjusted Use-Case Points (UUCP)} = \text{UUCW} + \text{UAW} = 60 + 7 = \textcolor{red}{67}$$

2. Adjust For Technical Complexity

Fact or	Description	Weight (W)	Rated Value (0 to 5) (RV)	Impact ($I = W \times RV$)
T1	Distributed System	2.0	0	2
T2	Response time or throughput performance objectives	1.0	4	4

T3	End user efficiency	1.0	4	4
T4	Complex internal processing	1.0	2	2
T5	Code must be reusable	1.0	3	3
T6	Easy to install	.5	4	2
T7	Easy to use	.5	5	2.5
T8	Portable	2.0	3	6
T9	Easy to change	1.0	3	3
T10	Concurrent	1.0	3	3
T11	Includes special security objectives	1.0	2	2
T12	Provides direct access for third parties	1.0	1	1
T13	Special user training facilities are required	1.0	0	0
Total Technical Factor (TFactor)				34.5

$$TCF = 0.6 + (0.01 \times TFactor) = 0.6 + 0.345 = \textcolor{red}{0.945}$$

3. Adjust For Environmental Complexity

Factor	Description	Weight (W)	Rated Value (0 to 5) (RV)	Impact (I = W × RV)
F1	Familiar with the project model that is used	1.5	3	4.5
F2	Application experience	.5	3	1.5

F3	Object-oriented experience	1.0	4	4
F4	Lead analyst capability	.5	5	2.5
F5	Motivation	1.0	3	2
F6	Stable requirements	2.0	2	4
F7	Part-time staff	-1.0	0	0
F8	Difficult programming language	-1.0	4	-4
Total Environment Factor (EFactor)				14.5

Calculate the Environmental Factor (EF) = $1.4 + (-0.03 \times \text{EFactor}) = 1.4 - 0.435 = \underline{0.965}$

4. Calculate Adjusted Use-Case Points (UCP)

4.1.

Adjusted Use-Case Points (UCP) = $\text{UUCP} \times \text{TCF} \times \text{EF} = 67 \times 0.945 \times 0.965 = 61.0989$

4.2.

We estimated 6 man-hours per UCP so,

Estimated Effort = $\text{UCP} \times \text{Hours} / \text{UCP}$

$$= 61.0989 \times 6$$

$$= 366.5938$$

4.3.

We estimated 46 man-hours per week so,

Estimated Time (in weeks) = $\text{Estimated Effort} / \text{man hours per week}$

$$= 366.5938 / 46$$

$$= 7.96 \text{ weeks}$$