



## IT 314 - Software Engineering

### Lab 4 - Group 14



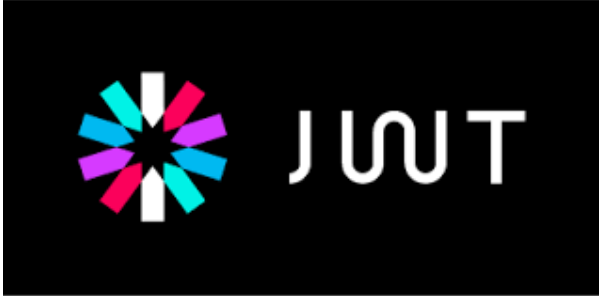

Date - Mar 9, 2023


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## Topic - Restaurant Automation System



### (a) Techs & Tools

#### Backend

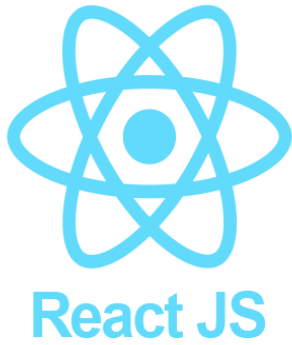
	<p><b>Node.js:</b> Backend framework based on Javascript</p>
	<p><b>Express.js:</b> Node.js based library for REST framework</p>
	<p><b>Json Web Token (JWT):</b> Node.js based library for authentication</p>
	<p><b>Sequelize:</b> Node.js based ORM for SQL database</p>

	<b>Mongoose:</b> Node.js based ORM for NoSQL database
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## Database

 Postgre <b>SQL</b>	<b>PostgreSQL:</b> SQL database
 mongo <b>DB</b> ®	+ <b>MongoDB:</b> NoSQL database

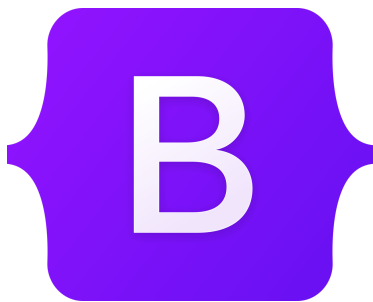
## Frontend



**React.js:** JavaScript based library for Frontend



**Cascading Style Sheets:** For Enhancing UI



**Bootstrap:** CSS framework for building responsive web apps



**HTML:** Standard markup language for creating web pages

### (c) Estimating with Use Case Points

#### Unadjusted Use Case Weight (UUCW):

- **simple:** login,signup, book table, table management, menu management
- **average:** inventory management,order management,bill management, cancel order
- **complex:** payment, order food, accounting

Use Case Complexity	Weight	Number of use cases	Product
Simple	5	5	25
Average	10	4	40
Complex	15	3	45

**UUCW** = (Total No. of Simple Use Cases x 5) + (Total No. of Average Use Casesx10) + (Total No. of Complex Use Cases x 15)

$$\begin{aligned} &= (5 \times 5) + (4 \times 10) + (3 \times 15) \\ &= (25 + 40 + 45) \\ &= 110 \end{aligned}$$

#### Unadjusted Actor Weight (UAW) :

**Simple:** Chef

**Average:** Admin, Staff

**Complex:** Customer

Actor Complexity	Weight	Number of Actors	Product
Simple	1	1	1

Average	2	1	2
Complex	3	2	6

$$\begin{aligned}
 \text{UAW} &= (\text{Total No. of Simple Actors} \times 1) + (\text{Total No. of Average Actors} \times 1) \\
 &+ (\text{Total No. of Complex Actors} \times 2) \\
 &= (1 \times 1) + (1 \times 2) + (3 \times 2) \\
 &= (1 + 2 + 6) \\
 &= 9
 \end{aligned}$$

$$\begin{aligned}
 \text{Unadjusted Use-Case Points (UUCP)} &= \text{UUCW} + \text{UAW} \\
 &= 110 + 9 \\
 &= 119
 \end{aligned}$$

#### Technical Complexity Factor(TCF):

Factor	Description	Weight	Rated Value(0 to 5)(RV)	Impact(I= W×RV)
T1	Distributed System	2.0	0	0
T2	Response time or throughput Performance objectives	1.0	3	3.0
T3	End user efficiency	1.0	3	3.0
T4	Complex internal processing	1.0	3	3.0
T5	Code must be reusable	1.0	4	4.0
T6	Easy to install	0.5	3	1.5

T7	Easy to use	0.5	4	2.0
T8	Portable	0.5	1	0.5
T9	Easy to change	1.0	1	1.0
T10	Concurrent	1.0	2	2.0
T11	Includes special security objectives	1.0	3	3.0
T12	Provides direct access for third parties	1.0	0	0
T13	Special user training facilities are required	1.0	0	0

**Total Technical Factor(TF)** = Sum of impact of all the factors  
= 23

**TCF(Technical Complexity Factor)** =  $0.6 + (0.01 \times TF)$   
= 0.83

**Environment Complexity Factor (ECF):**

Factor	Description	Weight	Rated Value (0 to5) RV	Impact (I = W x RV)
E1	Familiar with the development Process	1.5	3	4.5
E2	Application experience	0.5	3	1.5
E3	Object Oriented	1	3	3

	Experience			
E4	Lead analyst capability	0.5	3	1.5
E5	Motivation	1	2	2
E6	Stable requirement	2	2	4
E7	Part-time Staff	-1	0	0
E8	Difficult Programming language	-1	0	0

**Total E Factor (EF)** = Sum of impact of all the factors  
= 16.5

**ECF (Environmental Complexity Factors)** =  $1.4 + (-0.03 \times EF)$   
= 0.905

**Use Case Points (UCP) :**

UCP are the adjusted use case points.

**UCP** =  $(UUCP) \times TCF \times ECF$   
=  $(UUCW + UAW) \times TCF \times ECF$   
=  $(110 + 9) \times 0.83 \times 0.905$   
= 89.39

→ Approximately considering 4 man hours per use case point will be used

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



$$= 89.39 \times 4$$

$$= 357.56$$