Web-application for managing clientele information in OCS-Consulting B.V.
by Muhammad Tariq Arif Hussain

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Objective and problem-framing

Objective

To develop a customized database driven web-application for managing clientele information at OCS-Consulting B.V.

Problem Framing

- Monitoring status of projects, follow-up on the approval of contracts (labor intensive)
- Clientele information stored in multiple sources (error-prone activity)
- Generate contracts with variable formats (labor intensive)

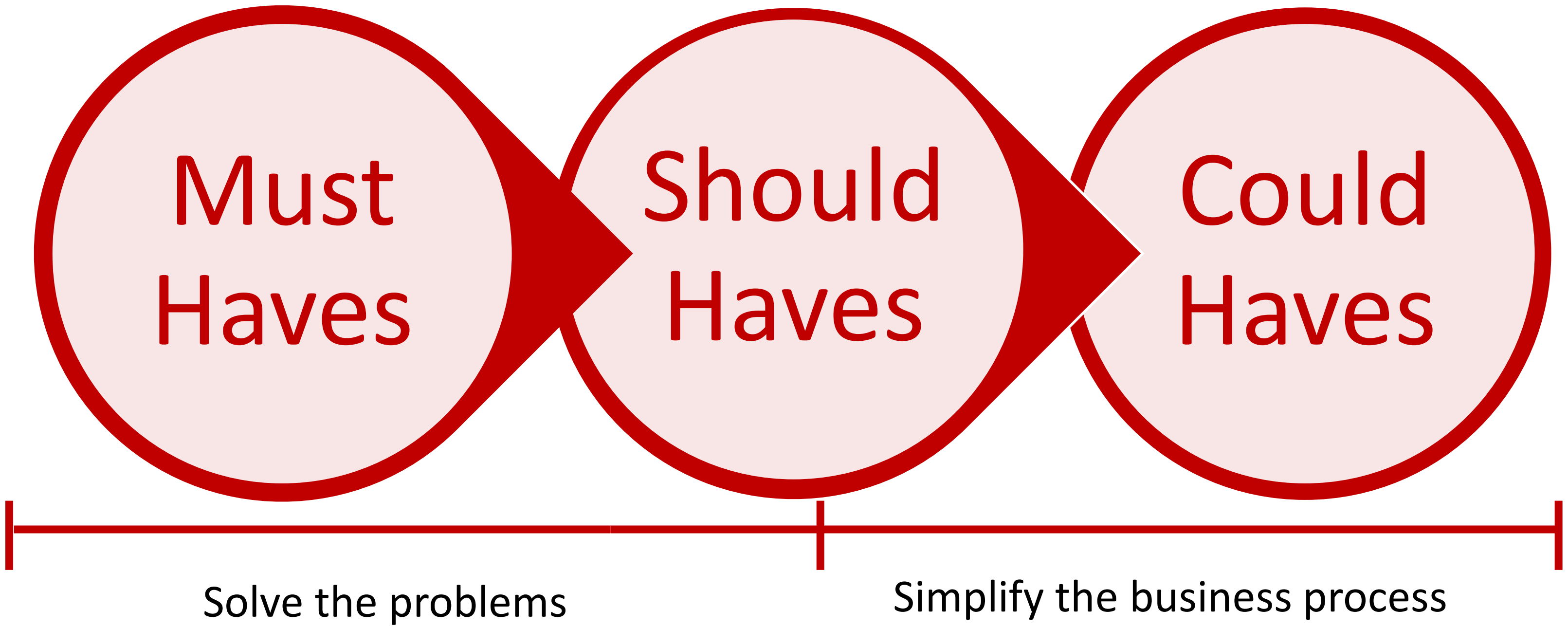
Planning

Planning

- Use AGILE methodology
- Made the plan in 5 stages
- STAGE 1- planning
- STAGES 2 and 3- gathering and prioritizing requirements, design and development, testing and implementation
- STAGE 4- use a data-visualization tool
- STAGE 5- deliver final report and presentation

MoSCoW Analysis

Objective: To prioritize solving of problems and meet the as many requirements as possible within set deadlines



Must Haves

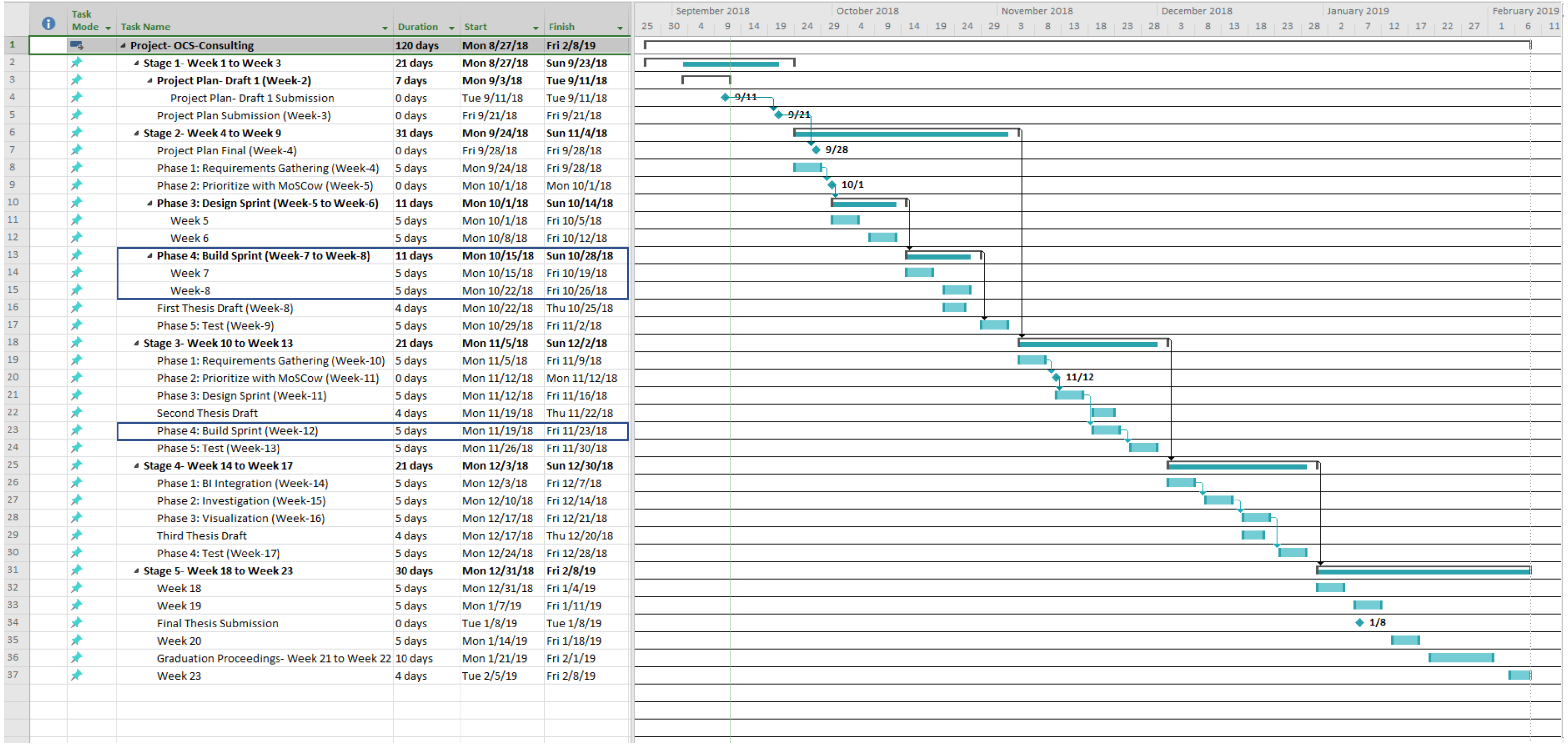
Should Haves

Could Haves

Solve the problems

Simplify the business process

Project Plan- Critical Path



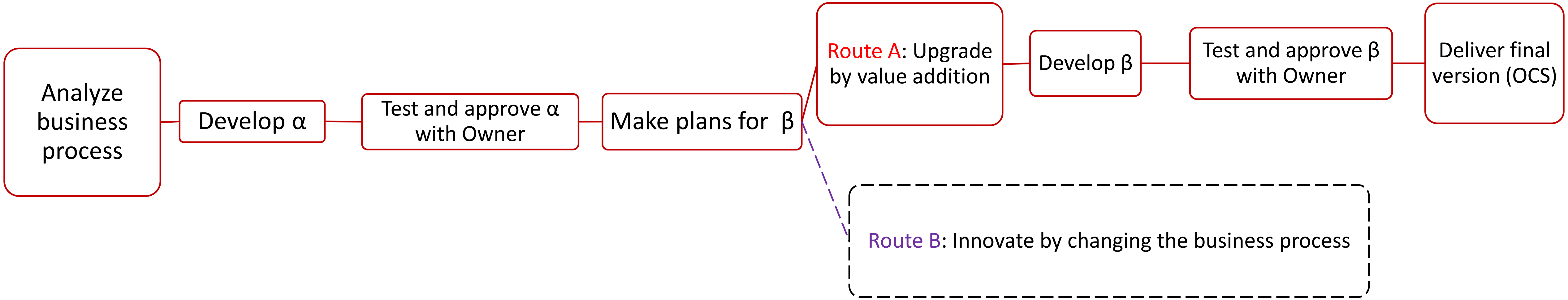
	ℹ	Task Mode	Task Name	Duration	Start	Finish
1			◢ **Project- OCS-Consulting**	**120 days**	**Mon 8/27/18**	**Fri 2/8/19**
2		📌	◢ **Stage 1- Week 1 to Week 3**	**21 days**	**Mon 8/27/18**	**Sun 9/23/18**
3		📌	◢ **Project Plan- Draft 1 (Week-2)**	**7 days**	**Mon 9/3/18**	**Tue 9/11/18**
4		📌	Project Plan- Draft 1 Submission	0 days	Tue 9/11/18	Tue 9/11/18
5		📌	Project Plan Submission (Week-3)	0 days	Fri 9/21/18	Fri 9/21/18
6		📌	◢ **Stage 2- Week 4 to Week 9**	**31 days**	**Mon 9/24/18**	**Sun 11/4/18**
7		📌	Project Plan Final (Week-4)	0 days	Fri 9/28/18	Fri 9/28/18
8		📌	Phase 1: Requirements Gathering (Week-4)	5 days	Mon 9/24/18	Fri 9/28/18
9		📌	Phase 2: Prioritize with MoSCow (Week-5)	0 days	Mon 10/1/18	Mon 10/1/18
10		📌	◢ **Phase 3: Design Sprint (Week-5 to Week-6)**	**11 days**	**Mon 10/1/18**	**Sun 10/14/18**
11		📌	Week 5	5 days	Mon 10/1/18	Fri 10/5/18
12		📌	Week 6	5 days	Mon 10/8/18	Fri 10/12/18
13		📌	◢ **Phase 4: Build Sprint (Week-7 to Week-8)**	**11 days**	**Mon 10/15/18**	**Sun 10/28/18**
14		📌	Week 7	5 days	Mon 10/15/18	Fri 10/19/18
15		📌	Week-8	5 days	Mon 10/22/18	Fri 10/26/18
16		📌	First Thesis Draft (Week-8)	4 days	Mon 10/22/18	Thu 10/25/18
17		📌	Phase 5: Test (Week-9)	5 days	Mon 10/29/18	Fri 11/2/18
18		📌	◢ **Stage 3- Week 10 to Week 13**	**21 days**	**Mon 11/5/18**	**Sun 12/2/18**
19		📌	Phase 1: Requirements Gathering (Week-10)	5 days	Mon 11/5/18	Fri 11/9/18
20		📌	Phase 2: Prioritize with MoSCow (Week-11)	0 days	Mon 11/12/18	Mon 11/12/18
21		📌	Phase 3: Design Sprint (Week-11)	5 days	Mon 11/12/18	Fri 11/16/18
22		📌	Second Thesis Draft	4 days	Mon 11/19/18	Thu 11/22/18
23		📌	Phase 4: Build Sprint (Week-12)	5 days	Mon 11/19/18	Fri 11/23/18
24		📌	Phase 5: Test (Week-13)	5 days	Mon 11/26/18	Fri 11/30/18
25		📌	◢ **Stage 4- Week 14 to Week 17**	**21 days**	**Mon 12/3/18**	**Sun 12/30/18**
26		📌	Phase 1: BI Integration (Week-14)	5 days	Mon 12/3/18	Fri 12/7/18
27		📌	Phase 2: Investigation (Week-15)	5 days	Mon 12/10/18	Fri 12/14/18
28		📌	Phase 3: Visualization (Week-16)	5 days	Mon 12/17/18	Fri 12/21/18
29		📌	Third Thesis Draft	4 days	Mon 12/17/18	Thu 12/20/18
30		📌	Phase 4: Test (Week-17)	5 days	Mon 12/24/18	Fri 12/28/18
31		📌	◢ **Stage 5- Week 18 to Week 23**	**30 days**	**Mon 12/31/18**	**Fri 2/8/19**
32		📌	Week 18	5 days	Mon 12/31/18	Fri 1/4/19
33		📌	Week 19	5 days	Mon 1/7/19	Fri 1/11/19
34		📌	Final Thesis Submission	0 days	Tue 1/8/19	Tue 1/8/19
35		📌	Week 20	5 days	Mon 1/14/19	Fri 1/18/19
36		📌	Graduation Proceedings- Week 21 to Week 22	10 days	Mon 1/21/19	Fri 2/1/19
37		📌	Week 23	4 days	Tue 2/5/19	Fri 2/8/19

Decision-analysis

Decision Analysis

α- Alpha Functional Model (Stage-2)

β- Beta Functional Model (Stage-3)



Analyze business process

Develop α

Test and approve α with Owner

Make plans for β

Route A: Upgrade by value addition

Develop β

Test and approve β with Owner

Deliver final version (OCS)

Route B: Innovate by changing the business process

Strategies Considered and their trade-offs

STRATEGY A:USE A SUITABLE CODE-GENERATOR

STRATEGY B: BUILD FROM SCRATCH

Feasibility Study

Feasibility Report

Based on feasibility studies for each design-decision, Strategy A-code-generator with AppGini is the best approach to meet all requirements.

Overview of requirements fulfilled in STAGE 3:

- MUST HAVES: ALL
- SHOULD HAVES: ALL
- COULD HAVES: ALL

User Acceptance Strategy

- Develop with AGILE
- Test with PO for approval
- Take on to PO’s modification request
- Decide on the naming of product
- Provide deployment strategies

Testing with Product Owner (PO)

USABILITY: PO's Approval acquired

Routines: PO's approval acquired

FEEDBACK: In Questionnaire

RESULT: Approval from PO

Challenges

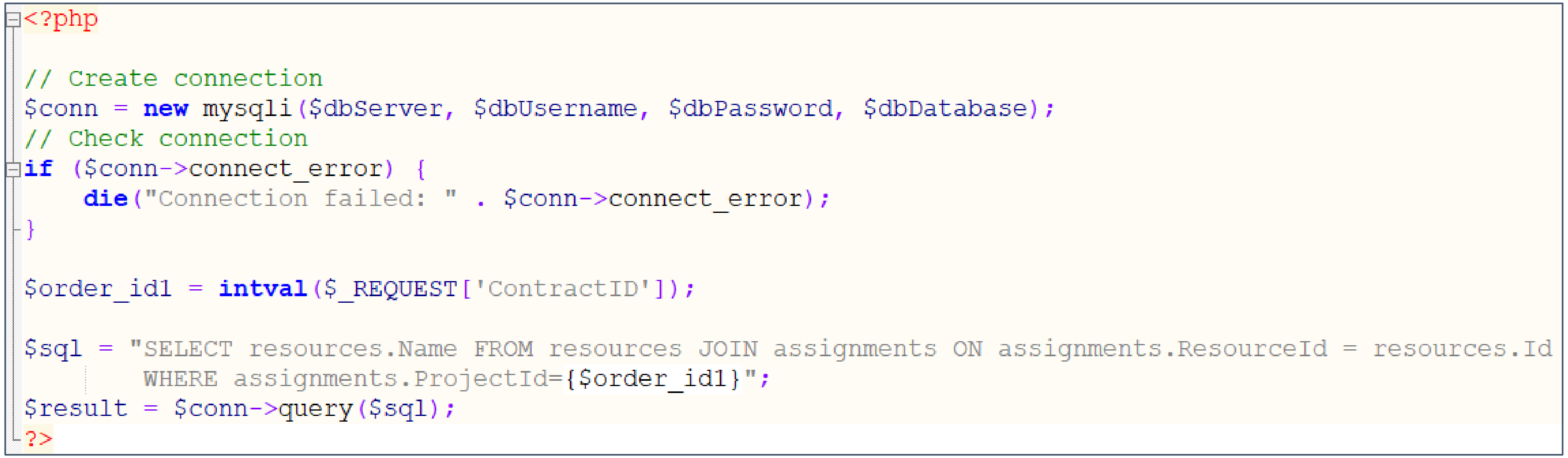
- Developing a web-application within 15 business days
- Utilizing relational aspects of a database
- Interviewing PO effectively
- Adjusting the plan to changes
- Meet overall expectations
- Analyzing current process for value addition

Results

- Established communication channels between stakeholders
- Used software development frameworks like MoSCoW
- Also incorporated AGILE methodology for successful completion
- Developed a web-application to fulfill client requirements
- Established interviewing techniques
- Delivered according to project-plan in critical path
- Deliver a cohesive solution

Code Analysis

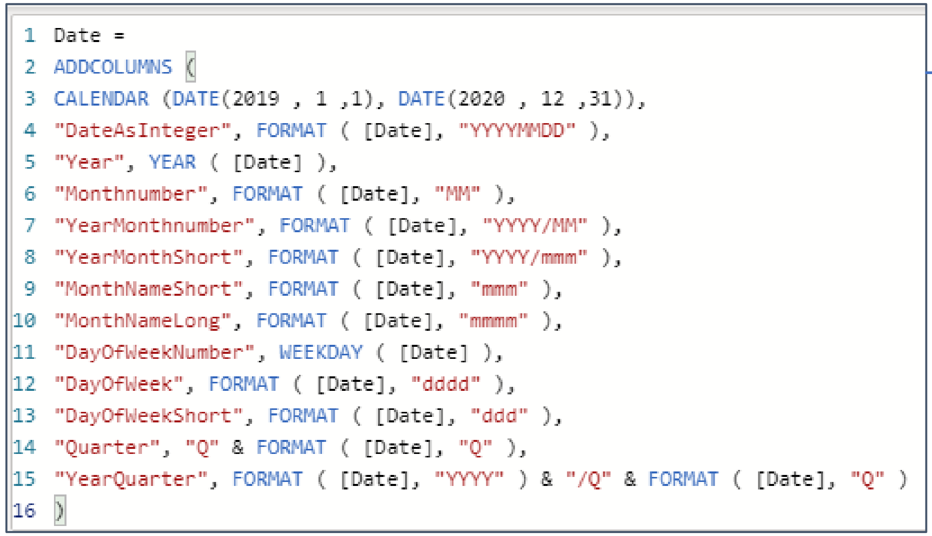
Code Analysis-1



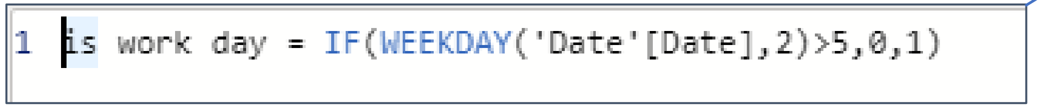
```php
<?php

// Create connection
$conn = new mysqli($dbServer, $dbUsername, $dbPassword, $dbDatabase);
// Check connection
if ($conn->connect_error) {
    die("Connection failed: " . $conn->connect_error);
}

$order_id1 = intval($_REQUEST['ContractID']);

$sql = "SELECT resources.Name FROM resources JOIN assignments ON assignments.ResourceId = resources.Id
        WHERE assignments.ProjectId={$order_id1}";
$result = $conn->query($sql);
?>
```

- This is the php code injected into the custom HTML pages used to generate the contracts in EN & NL. This allowed me to circumvent the constraint of atomic-values with Alpha Functional Model. A direct connection with the MySQL database had to be created to keep the variability of the other attributes intact. It was a simple yet effective work-around solution.
- The SQL code is used to join the *resources* and *assignments* tables of the concerned MySQL database *client_information.*

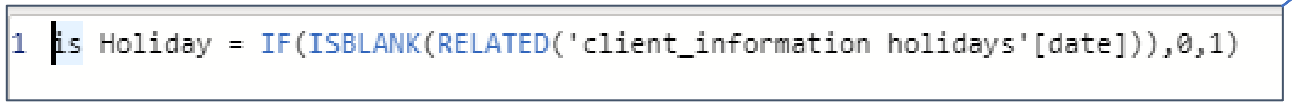
Code Analysis-2



```
1  Date =
2  ADDCOLUMNS (
3  CALENDAR (DATE(2019 , 1 ,1), DATE(2020 , 12 ,31)),
4  "DateAsInteger", FORMAT ( [Date], "YYYYMMDD" ),
5  "Year", YEAR ( [Date] ),
6  "Monthnumber", FORMAT ( [Date], "MM" ),
7  "YearMonthnumber", FORMAT ( [Date], "YYYY/MM" ),
8  "YearMonthShort", FORMAT ( [Date], "YYYY/mmm" ),
9  "MonthNameShort", FORMAT ( [Date], "mmm" ),
10 "MonthNameLong", FORMAT ( [Date], "mmmm" ),
11 "DayOfWeekNumber", WEEKDAY ( [Date] ),
12 "DayOfWeek", FORMAT ( [Date], "dddd" ),
13 "DayOfWeekShort", FORMAT ( [Date], "ddd" ),
14 "Quarter", "Q" & FORMAT ( [Date], "Q" ),
15 "YearQuarter", FORMAT ( [Date], "YYYY" ) & "/Q" & FORMAT ( [Date], "Q" )
16 )
```



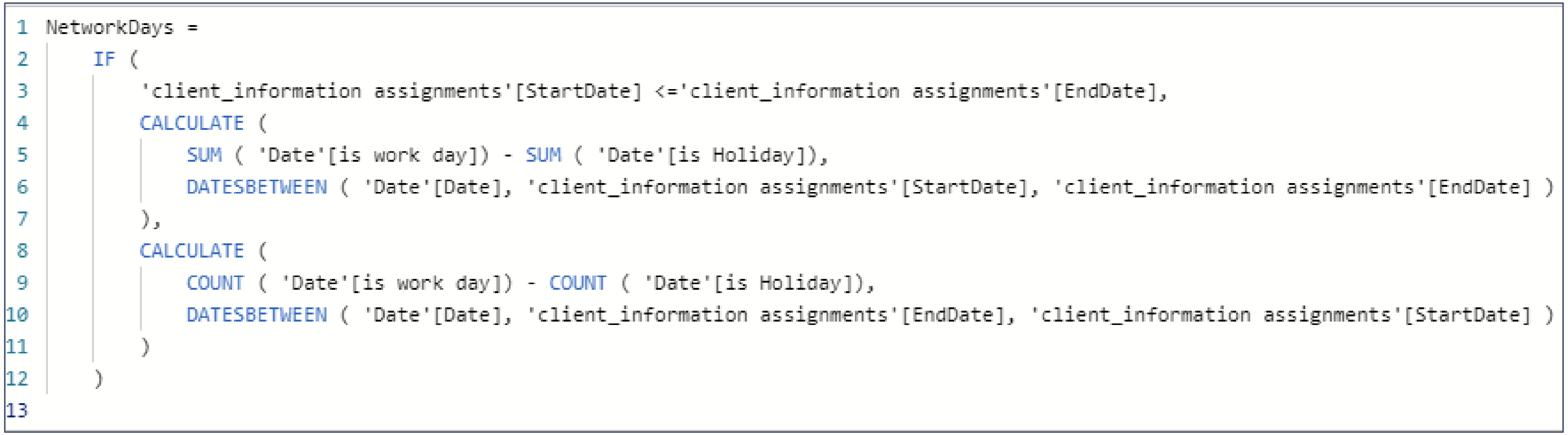
```
is work day = IF(WEEKDAY('Date'[Date],2)>5,0,1)
```



```
is Holiday = IF(ISBLANK(RELATED('client_information holidays'[date])),0,1)
```

- First snippet (1 to 16) is the DAX code used to create the CALENDAR view on Microsoft POWER BI
- Second line i.e. ‘is work day’ is the DAX measure used to calculate all weekdays in the CALENDAR
- Third line i.e. ‘is Holiday’ is the DAX measure used to calculate all holidays of the Netherlands, including weekends.

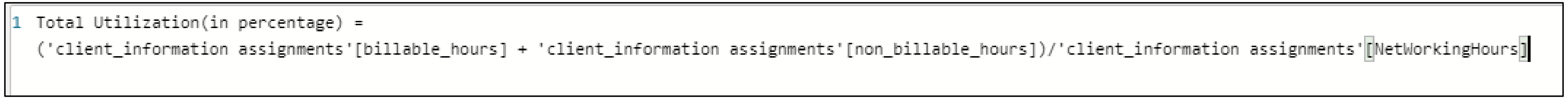
Code Analysis-3



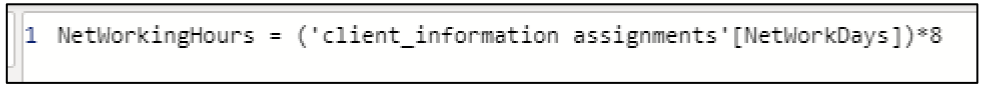
```
NetworkDays =
    IF (
        'client_information assignments'[StartDate] <='client_information assignments'[EndDate],
        CALCULATE (
            SUM ( 'Date'[is work day]) - SUM ( 'Date'[is Holiday]),
            DATESBETWEEN ( 'Date'[Date], 'client_information assignments'[StartDate], 'client_information assignments'[EndDate] )
        ),
        CALCULATE (
            COUNT ( 'Date'[is work day]) - COUNT ( 'Date'[is Holiday]),
            DATESBETWEEN ( 'Date'[Date], 'client_information assignments'[EndDate], 'client_information assignments'[StartDate] )
        )
    )

```

- This is the DAX formula used to calculate NetworkDays i.e. the figure that represents the number of days between the start and end dates of an assignment.
- *client_information* is the name of the concerned MySQL database and *assignments* is a the table from which this information needs to be extracted.

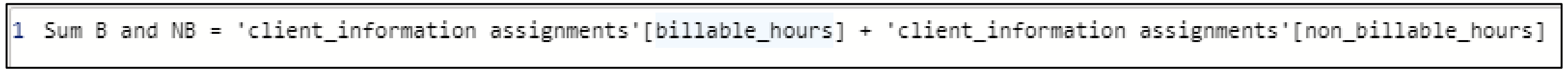
Code Analysis-4



```
Total Utilization(in percentage) =
('client_information assignments'[billable_hours] + 'client_information assignments'[non_billable_hours])/'client_information assignments'[NetWorkingHours]
```



```
NetWorkingHours = ('client_information assignments'[NetWorkDays])*8
```



```
Sum B and NB = 'client_information assignments'[billable_hours] + 'client_information assignments'[non_billable_hours]
```

- The Average Utilization(in percentage) of each consultant (resource) is based on the formula ‘Total Utilization(in percentage)’ as mentioned above. It is basically the sum of the billable (payable) and non-billable (nonpaid) hours divided by the total number of hours spent by a consultant or the NetWorkingHours. A ‘Line and clustered column chart’ is used to visualize this data with Average Utilization(in percentage) being a line over the billable and non-billable hours clustered into columns.
- The ‘NetWorkingHours’ is calculated as the number of NetworkDays times 8. This is due to the employed standard of each business day being allocated a maximum of 8 hours.
- Finally ‘Sum B and NB’ is the formula that adds the number of billable hours and non-billable hours of work done by a consultant.

Summary

- Analyzed the business process
- Delivered according to plan
- Solved the problems addressed
- Simplified business process
- Organized data to provide business intelligence
- Planed for user acceptance
- Planed for independent professionalism
- Planed to share the engineering details behind the application(s) in the Process Report.
- Accomplished the personal learning goals
- Recorded daily-updates

Demo

ICT and Business

Supply Chain Management	Kanban, kaizen, customer needs prioritization
System Development in practice (Project)	AGILE, MoSCoW, critical path analysis
Data Visualization (Minor)	Getting and cleaning data
EDB2 and EDB3	Normalization of tables, joining tables with queries
Project Management	Creating project-plan
UID for Business	No opinion steering technique
Data driven business lab	Microsoft POWER-BI integration with LimeSurvey
Web Development 1 and 2	HTML and wire-framing