

# Test Suite

For

# Factory Service Simulation Software

(FSSS)

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# CONTENTS

TOPIC	Pg No.
1.Unit Testing For Classes	3
1.1. Machine Type	3
1.2 Machine	4
1.3 Adjuster Type	5
1.4 Adjuster	6
1.5 Service manager	7
2.GUI Functionality testing	8
2.1 Service Manager sign up	8
2.2 Service Manager login	9
2.3 Add Machine	10
2.4 Add Adjuster	12
2.5 Edit Machine	13
2.6 Edit Adjuster	14
2.7 Del Machine	14
2.8 Del Adjuster	15
2.9 Show Machine	15
2.10 Show Adjuster	16
2.11 Select Machine	16
2.12 Select Adjuster	16
3.Application Testing	17

3.1. Test Case 1	17
3.2. Test Case 2	18
3.3. Test Case 3	20

# **1. Unit Testing For Classes**

For each of the 5 classes we take appropriate test cases according to scenarios described in the test plan. The expected golden output is given in this document for the test cases which exhaustively enumerates all the possible cases in which the functionality may give erroneous output.

There are 5 main classes here, whose objects have been instantiated and their outputs are being tested. They are : MachineType, Machine, AdjusterType, Adjuster and ServiceManager.

## **1.1. MachineType**

5 objects are created A,B,C,D,E:

### **Constructor**

Function call: A(a,12,32,50), B(b,-4,22,100), C(c,0,13,60), D(d,34,100,90), E(e,7,5,1001)

Golden Output: B :: Error message Negative MTTF  
C :: Error message Zero MTTF  
D :: Error message large Repair time  
E :: Error message large quantity

### **Get\_name()**

Function call: A.get\_name()

Golden output: a

### **Get\_MTTF()**

Function call: A.Get\_MTTF()

Golden output: 12

### **Get\_time\_repair()**

Function call: A.Get\_time\_repair()

Golden output: 32

### **Get\_machine\_no()**

Function call: A.Get\_machine\_no()

Golden output:50

**Set\_name()**

Function call:A.Set\_name(cd)

A.Get\_name()

Golden output:cd

**Set\_MTTF()**

Function call:A.Set\_MTTF(45)

A.Get\_MTTF()

Golden output:45

**Set\_time\_repair()**

Function call:A.Set\_time\_repair(11)

A.Get\_time\_repair()

Golden output:11

**Set\_machine\_no()**

Function call:A.Set\_machine\_no(541)

A.Get\_machine\_no()

Golden output:541

## **1.2. Machine**

5 objects are created A,B,C,D,E:

**Constructor**

Function call:A(a,12,32,50),B(b,-4,22,100),C(c,0,13,60),D(d,34,219,90),E(e,7,5,1001)

Golden Output: B ::Error message Negative MTTF

C:: Error message Zero MTTF

D:: Error message large Repair time

E::Error message Large quantity

**Set\_Id(),Get\_Id():**

Function call:A.Set\_Id(qw)

A.Get\_Id()

Golden Output:qw

**Set\_working\_status(),Get\_working\_status()**

Function call:A.Set\_working\_status(1)

A.Get\_working\_status()

Golden Output:1

**Set\_repairing\_status(),Get\_repairing\_status()**

Function call:A.Set\_repairing\_status(0)

A.Get\_Repairing\_status()

Golden Output:0

**Set\_working\_days(),Get\_working\_days()**

Function call:A.Set\_working\_days(21)

A.Get\_working\_days()

Golden Output:21

**Set\_total\_working\_days(),Get\_total\_working\_days()**

Function call:A.Set\_total\_working\_days(33)

A.Get\_total\_working\_days()

Golden Output:33

**Set\_req\_day(),Get\_req\_day()**

Function call:A.Set\_req\_day(13)

A.Get\_req\_day()

Golden Output:13

**1.3. AdjusterType**

3 objects are created A,B,C:

**Constructor**

```
ArrayList<String>mac=new ArrayList<String>(Arrays.asList("lathe","turning"));
```

```
ArrayList<String>mach=new ArrayList<String>(Arrays.asList("lathe"));
```

Function call:A(a,12,mac)    B(b,1001,mach)    C(c,-5,mac)    D(d,0,mach)

Golden Output: B ::Error message Large machine quantity

C ::Error message negative quantity

D:: Error message no machines

**Get\_name()**

Function call::A.Get\_name()

Golden Output::a

**Get\_Adjuster\_no()**

Function call::A.get\_Adjuster\_no()

Golden Output::12

**Get\_repir\_machine()**

Function call::A.Get\_repair\_machine()

Golden Output::{lathe,turning}

**Set\_name()**

Function call::A.Set\_name(pq)

A.Get\_name()

Golden Output::pq

**Set\_Adjuster\_no()**

Function call::A.Set\_Adjuster\_no(99)

A.Get\_Adjuster\_no()

Golden Output::99

**Add\_repair\_machine**

Function call::A.Add\_repair\_machine("welding")

A.Get\_repir\_machine()

Golden Output::{lathe,turning,welding}

**1.4. Adjuster**

3 objects are created A,B,C:

**Constructor**

```
ArrayList<String>mac=new ArrayList<String>(Arrays.asList("lathe","turning"));
```

```
ArrayList<String>mach=new ArrayList<String>(Arrays.asList("lathe"));
```

```
Function call:A(a,12,mac)      B(b,1001,mach)      C(c,-5,mac)  D(d,0,mach)
```

```
Golden Output: B ::Error message Large machine quantity
```

C:: Error message Negative quantity  
D:: Error message Zero quantity

**Set\_Id(),Get\_Id():**

Function call:A.Set\_Id(yz)  
A.Get\_Id()  
Golden Output:yz

**Set\_working\_status(),Get\_working\_status()**

Function call:A.Set\_working\_status(1)  
A.Get\_working\_status()  
Golden Output:1

**Set\_repairing\_status(),Get\_repairing\_status()**

Function call:A.Set\_repairing\_status(0)  
A.Get\_Repairing\_status()  
Golden Output:0

**Set\_days\_working(),Get\_days\_working()**

Function call:A.Set\_day\_working(34)  
A.Get\_days\_working()  
Golden Output:34

**Set\_req\_day(),Get\_req\_day()**

Function call:A.Set\_req\_day(7)  
A.Get\_req\_day()  
Golden Output:7

## **1.5. Service Manager**

2 objects of the Service Manager are created .Objects are named as A and B

**Constructor:**

A(a,ab)      B(be,cdf)

**getUser\_Id()**



Function call:A.getUser\_Id()

Golden output:a

Function call:B.getUser\_Id()

Golden output:be

### **getPassword()**

Function call:A.getPassword()

Golden output:ab

Function call:B.getPassword()

Golden output:cdf

### **setUser\_Id()**

Function call:A.setUser\_Id(c)

A.getUser\_Id()

Golden output:c

Function call:B.setUser\_Id(l)

B.getUser\_Id()

Golden output:l

### **setPassword()**

Function call: A.setPassword(kj)

A.getPassword()

Golden output:kj

Function call:B.setPassword(mn)

B.getPassword()

Golden output:mn

## **2. GUI FUNCTIONALITY TESTING**

The expected output corresponding to these functionalities is to be checked manually to determine if the given functionalities perform as expected .

### **2.1. Service manager sign up**

**This testing is for signing up the service manager with a user id and password.He can use the program using this password and user id**

Following test cases are given:

1.user id:ram

Password:aB9  
Confirm password:aB9

2.user id:  
Password:alK0  
Confirm password:alK0

|

3.user id:jack  
Password:alU2  
Confirm password:

4.user id:tony  
Password:  
Confirm password:al3T

5.user id:tony  
Password:al7R  
Confirm password:se

6.user id:Gary  
Password:alR  
Confirm password:alR

### **Expected Output:**

**(Case --> Output)**

- 1.No error message
2. Error message No user id
- 3.Error message: Confirm password
- 4.Error message: Enter password
- 5.Error message: Password different in confirm
- 6.Error message Password should have atleast one upper case alphabet,one lower case alphabet and one numeric digit

### **2.2. Service manager login:**

**This feature is for secure use of the software.It checks if a user with a given user id and password is allowed to use the software.If such a user exists it opens a new window where the user can give necessary input to the software.**

Account user id:ram  
Password:abc9R

**Test Cases**

- 1.user id:ram  
Password:abc9R
- 2.user id:al  
Password:af
- 3.user id:ram  
Password:po
- 4.user id:  
Password:fg
- 5.user id:  
Password:

**Expected Output****(Case --> Output)**

- 1.No Error message
- 2.Error message: No such user present in database
- 3.Error message: Wrong password
- 4,5. Error message Incomplete data

**2.3. Add Machine**

**This testing is for an 'PageAddMachine' which allows the user to add machines to the database.**

*\*We assume that there exists a machine with details as follows(for case 7):*

*Machine type: Milling*

*MTTF:20*

*Repair time:20*

*Quantity:120*

**Test cases**

- 1.Machine type: turning  
MTTF:10  
Repair time:45  
Quantity:78

**2.Machine type:**

MTTF:12

Repair time:15

Quantity:276

**3.Machine type:lathe**

MTTF:-7

Repair time:178

Quantity:50

**4.Machine type:tutning**

MTTF:0

Repair time:178

Quantity:67

**5.Machine type:lathe**

MTTF:32

Repair time:219009

Quantity:89

**6.Machine type:turning**

MTTF:90

Repair time:78

Quantity:10000

**7.Machine type: Milling**

MTTF:80

Repair time:7

Quantity:38

**8.Machine type: Drill**

MTTF:

Repair time:15

Quantity:276

**9.Machine type: Drill**

MTTF: 100

Repair time:0

Quantity:276

10. Machine type: Drill

MTTF:

Repair time: 15

Quantity: -56

### Expected Output

#### (Case --> Output)

1. No Error message
2. Error message: No machine name given
3. Error message: MTTF cannot be negative or zero
4. Error message: MTTF cannot be negative or zero
5. Error message: Repair time very large
6. Error message: Large quantity
7. Error message: Machine with same name already exists
8. Error message: No MTTF given
9. Error message: Repair time cannot be negative or zero
10. Error message: Quantity cannot be negative or zero

### 2.4. Add Adjuster

This testing is for 'PageAddAdjuster' which allows the user to add an adjuster to the database.

*\*We assume that there exists an adjuster with details as follows:*

*Adjuster Id: B*

*Machine type: lathe, turning, milling*

*Quantity: 17*

#### Test Cases:

1. Adjuster Id: A  
Machine type: lathe, turning  
Quantity: 12
2. Adjuster Id:  
Machine type: lathe, turning  
Quantity: 16
3. Adjuster Id: A  
Machine type: lathe, turning  
Quantity: 1001
4. Adjuster Id: A

Machine type:lathe,turning  
Quantity:-7

5.Adjuster Id:A  
Machine type:lathe,turning  
Quantity:0

6. Adjuster Id:B  
Machine type:milling  
Quantity:11

**Expected Output:**

**(Case --> Output)**

- 1.No Error message
- 2.Error message: No Adjuster Id given
- 3.Error message: Large quantity
- 4,5.Error message Quantity cannot be negative or zero
- 6 Error message: Adjuster with same name already exists

**2.5. Edit Machine**

**This testing is for 'PageEditMachine' which allows user to change the quantity of a particular machine in database / selected for simulation.**

**Test Cases:**

- 1.Machine name:turning  
Quantity:200
- 2.Machine name:lathe  
Quantity:10001
- 3.Machine name: CNF  
Quantity:-3

4. Machine name: Welding machine  
Quantity: 0

### **Expected Output**

#### **(Case --> Output)**

1. No Error message
2. Error message: Large quantity
- 3, 4. Error message Quantity cannot be negative or zero

### **2.6. Edit Adjuster**

**This testing is for 'PageEditAdjuster' which allows user to change the quantity of a particular adjuster in database / selected for simulation.**

#### **Test Cases:**

1. Adjuster name: A  
Quantity: 200
2. Adjuster name: B  
Quantity: 20000
3. Adjuster name C  
Quantity: -3
4. Adjuster name D  
Quantity: 0

### **Expected Output**

#### **(Case --> Output)**

1. No Error message
2. Error message: Large quantity
- 3, 4. Error message Quantity can not be negative or zero

### **2.7. Del Machine**

**This testing is for 'PageDelMachine' which allows the user to delete a particular machine in database / selected for simulation.**

*\*We assume that there exists a machine with details as follows(for case 1):*

*Machine type: Turning*

*MTTF:20*

*Repair time:20*

*Quantity:120*

**Test Cases:**

1.machine name:Turning

2.machine name: (In case of empty machine database)

**Expected Output**

**(Case --> Output)**

1.No Error message

2.Error message: No machine present

**2.8. Del Adjuster**

**This testing is for a 'PageDelAdjuster' which allows the user to delete a particular adjuster in database / selected for simulation.**

*\*We assume that there exists an adjuster with details as follows:*

*Adjuster Id:A*

*Machine type:lathe,turning,milling*

*Quantity:17*

**Test Cases:**

1.Adjuster name:A

2.Adjsuter name: (In case of empty adjuster database)

**Expected Output**

**(Case --> Output)**

1.No Error message

2.Error message: No adjuster present

**2.9. Show Machine**

**This testing is for 'ShowMachine' which allows the user to see all machines in database/selected for simulation.**



**Test Cases:**

- 1.machine name:turning,lathe
- 2.machine name: (no machine present)

**Expected Output**

**(Case --> Output)**

- 1.No error (shows tabular information for both machines)
- 2.Error message: no machine present

**2.10. Show adjuster**

This testing is for a 'ShowAdjuster' which allows the user to see all adjusters in database/selected for simulation.

**Test Cases:**

- 1.adjuster name:a,b,c,d
- 2.adjuster name: (no adjuster present)

**Expected Output**

**(Case --> Output)**

- 1.No error (shows tabular information for all adjusters)
- 2.Error message: No adjuster present

**2.11. Select machine**

This testing is for a 'SelMachine' which allows the user to select machines from database for simulation.

**Test Cases:**

- 1.machine name:turning,lathe

**Expected Output**

**(Case --> Output)**

- 1.No Error message

**2.12. Select adjuster**

This testing is for a 'SelAdjuster' which allows the user to select adjusters from database for simulation.

**Test Cases:**

1.adjuster name:a,b,c,d

**Expected Output**

(Case --> Output)

1.No error message

### **3. APPLICATION TESTING**

We check if the simulation gives correct output by taking 3 inputs. These three cases are taken as appropriate input and we run through the complete project and at last the simulation results are displayed. If the program gives output which matches those listed here, the application testing is complete and successful.

#### **3.1. Test Case 1**

**Machines**

Machine type	MTTF(in days)	Repair time	Quantity
Lathe	60	4	25
Turning	60	9	15
CNF	40	15	25

**Adjusters**

Adjuster name	Type of machine	Quantity
a	turning	5
B	turning,lathe	5
C	CNF,turning	6

Simulation Time=1 years

### **EXPECTED OUTPUT**

#### **Individual Machine Utilization**

<b>Machine</b>	<b>Percentage utilization</b>
lathe	77.67672
turning	83.39727
CNF	72.78903

#### **Individual Adjuster Utilization**

<b>Adjuster</b>	<b>Percentage Utilization</b>
a	24.657532
B	83.56164
C	44.97717

#### **Average Simulation**

<b>Field</b>	<b>Percentage utilization</b>
Average Machine Utilization	77.117004
Average Adjuster Utilization	50.684937

## **3.2. Test Case 2**

#### **Machines**

Machine type	MTTF(in days)	Repair time	Quantity
Lathe	60	4	25
Turning	60	9	15

### Adjusters

Adjuster name	Type of machine	Quantity
a	turning	5
B	turning,lathe	5
C	CNF,turning	6

**Simulation Time=3years**

### EXPECTED OUTPUT

#### Individual Machine Utilization

Machine	Percentage utilization
lathe	89.362564
turning	91.57991

#### Individual Adjuster Utilization

Adjuster	Percentage Utilization
a	13.972603
B	14.136987
C	31.887367

**Average Simulation**

Field	Percentage utilization
Average Machine Utilization	90.194084
Average Adjuster Utilization	20.742008

**3.3. Test Case 3****Machines**

Machine type	MTTF(in days)	Repair time	Quantity
Lathe	60	4	25
Turning	60	9	15
CNF	40	15	25

**Adjusters**

Adjuster name	Type of machine	Quantity
B	turning,lathe	5
C	CNF,turning	6

**Simulation Time=9 years****EXPECTED OUTPUT**

**Individual Machine Utilization**

Machine	Percentage utilization
lathe	73.27732
turning	74.95485
CNF	78.58509

**Individual Adjuster Utilization**

Adjuster	Percentage Utilization
B	86.70928
C	72.79554

**Average Simulation**

Field	Percentage utilization
Average Machine Utilization	75.70588
Average Adjuster Utilization	79.119965

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