QUESTION NO 4 – POWER

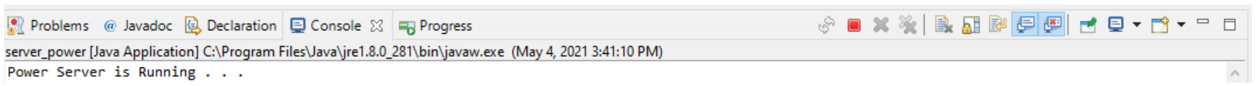
CLIENT

```
package client;
import org.omg.CosNaming.*;
import org.omg.CORBA.*;
import Power.*;
public class client_power {
public static void main(String [] args) {
try {
ORB orb = ORB.init(args,null);
org.omg.CORBA.Object objRef = orb.resolve_initial_references("NameService");
NamingContextExt ncRef = NamingContextExtHelper.narrow(objRef);
PowerServer ss= PowerServerHelper.narrow(ncRef.resolve_str("FACT-SERVER"));
int addSolution = ss.Power(5,4);
System.out.println("Sum = " + addSolution);
}
catch(Exception e) {
System.out.println("Exception: " + e.getMessage());
}
}
}
```

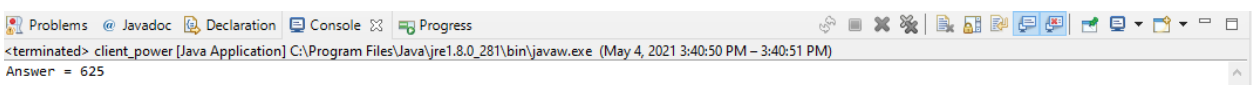
SERVER

```
package server;
import org.omg.CosNaming.*;
import org.omg.PortableServer.*;
import org.omg.CORBA.*;
import Power.*;
import Power.PowerServerPOA;
public class server_power extends PowerServerPOA{
public int Power (int a, int b) {
int sum =1;
for (int i = 0; i<b; i++)
{
         sum = sum * a;
}
return sum;
}
public static void main(String [] args) {
try {
ORB orb = ORB.init(args,null);
POA rootpoa = POAHelper.narrow(orb.resolve_initial_references("RootPOA"));
rootpoa.the_POAManager().activate();
server_power ssi = new server_power();
org.omg.CORBA.Object ref = rootpoa.servant_to_reference(ssi);
PowerServer ss= PowerServerHelper.narrow(ref);
org.omg.CORBA.Object objRef= orb.resolve_initial_references("NameService");
NamingContextExt ncRef = NamingContextExtHelper.narrow(objRef);
NameComponent path[]=ncRef.to_name("FACT-SERVER");
ncRef.rebind(path, ss);
System.out.println("Power Server is Running . . .");
orb.run();
}
catch(Exception e)
{
System.out.println("Exception: " + e.getMessage());
}
}
```

OUTPUT (5^4)



```
server_power [Java Application] C:\Program Files\Java\jre1.8.0_281\bin\javaw.exe (May 4, 2021 3:41:10 PM)
Power Server is Running . . .
```



```
<terminated> client_power [Java Application] C:\Program Files\Java\jre1.8.0_281\bin\javaw.exe (May 4, 2021 3:40:50 PM – 3:40:51 PM)
Answer = 625
```

QUESTION NO 4 – CURRENCY

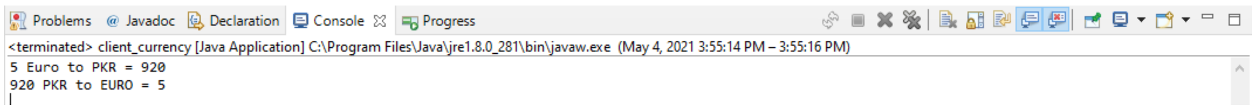
CLIENT

```
package client;
import org.omg.CosNaming.*;
import org.omg.CORBA.*;
import Currency.*;
public class client_currency {
public static void main(String [] args) {
try {
ORB orb = ORB.init(args,null);
org.omg.CORBA.Object objRef = orb.resolve_initial_references("NameService");
NamingContextExt ncRef = NamingContextExtHelper.narrow(objRef);
CurrencyServer ss= CurrencyServerHelper.narrow(ncRef.resolve_str("FACT-SERVER"));
long EuroSolution = ss.Currency(5,184);
long PKRSolution = ss.Currency(920, 184);
System.out.println("5 Euro to PKR = " + EuroSolution);
System.out.println("920 PKR to EURO = " + PKRSolution);
}
catch(Exception e) {
System.out.println("Exception: " + e.getMessage());
}
}
```

SERVER

```
package server;
import org.omg.CosNaming.*;
import org.omg.PortableServer.*;
import org.omg.CORBA.*;
import Currency.*;
import Currency.CurrencyServerPOA;
public class server_currency extends CurrencyServerPOA{
public int Currency (int a, int b) {
int sum = 0;
if (a < 10)
{
         sum = a * b;
}
else
{
         sum = a/b;
}
return sum;
}
public static void main(String [] args) {
try {
ORB orb = ORB.init(args,null);
POA rootpoa = POAHelper.narrow(orb.resolve_initial_references("RootPOA"));
rootpoa.the_POAManager().activate();
server_currency ssi = new server_currency();
org.omg.CORBA.Object ref = rootpoa.servant_to_reference(ssi);
CurrencyServer ss= CurrencyServerHelper.narrow(ref);
org.omg.CORBA.Object objRef= orb.resolve_initial_references("NameService");
NamingContextExt ncRef = NamingContextExtHelper.narrow(objRef);
NameComponent path[]=ncRef.to_name("FACT-SERVER");
ncRef.rebind(path, ss);
System.out.println("Currency Server is Running . . .");
orb.run();
}
catch(Exception e)
{
System.out.println("Exception: " + e.getMessage());
}
}
```

OUTPUT



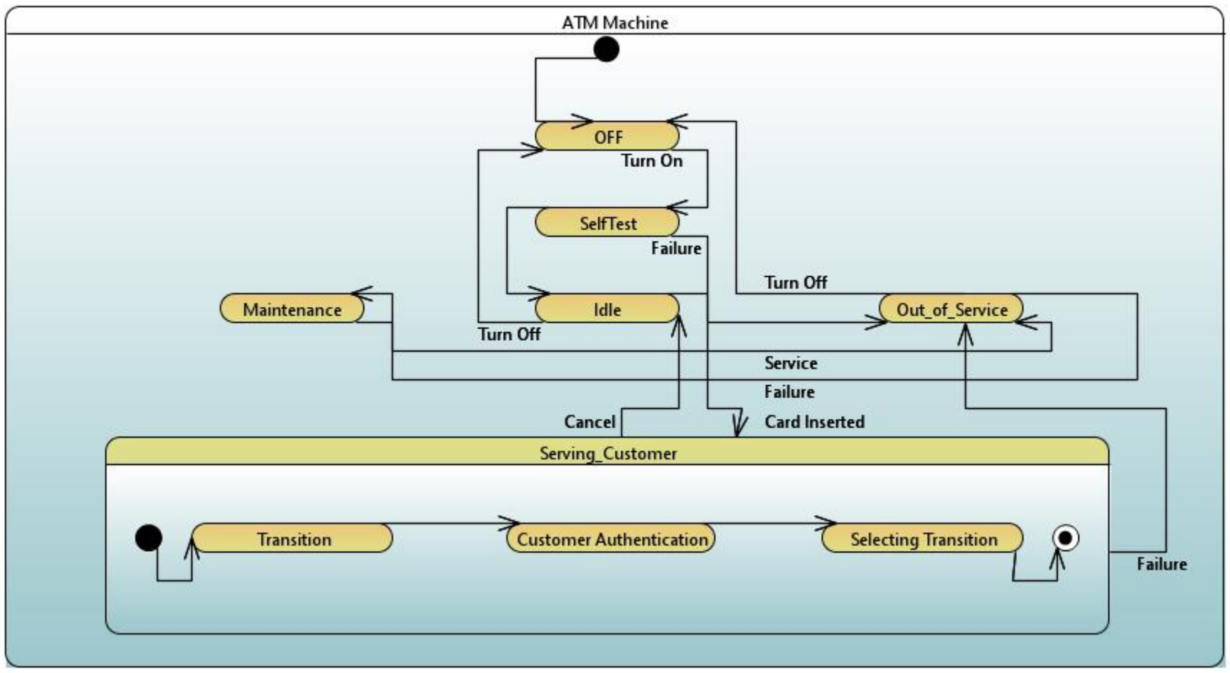
```
<terminated> client_currency [Java Application] C:\Program Files\Java\jre1.8.0_281\bin\javaw.exe (May 4, 2021 3:55:14 PM – 3:55:16 PM)
5 Euro to PKR = 920
920 PKR to EURO = 5
```

QUESTION 1 – STATE MACHINE DIAGRAM (ATM)

An automated teller machine (ATM) is an electronic banking outlet that allows customers to complete basic transactions without the aid of a branch representative or teller. Anyone with a credit card or debit card can access cash at most ATMs. ATMs are convenient, allowing consumers to perform quick self-service transactions such as deposits, cash withdrawals, bill payments, and transfers between accounts.

The ATM goes through several states. The initial state of the ATM machine is Off when machine turns On it goes for the Self Test, to check itself if the test is ok then it goes to Idle state otherwise it goes to the Out of Service state it can go to Off state too, for maintenance of the ATM, Idle state goes to Maintenance and ultimately to the Out of Service state because Machine will not be providing service to the customer during Maintenance. There is a substate Servicing Customer inside ATM having states Customer Authentication, Selecting Transaction and Transaction, now this is the working state of the ATM machine where it provide services to the user when card is inserted, incase of any failure during working state machine goes back to maintenance state. When transaction is done, card is ejected; machine goes back to idle state.

DIAGRAM



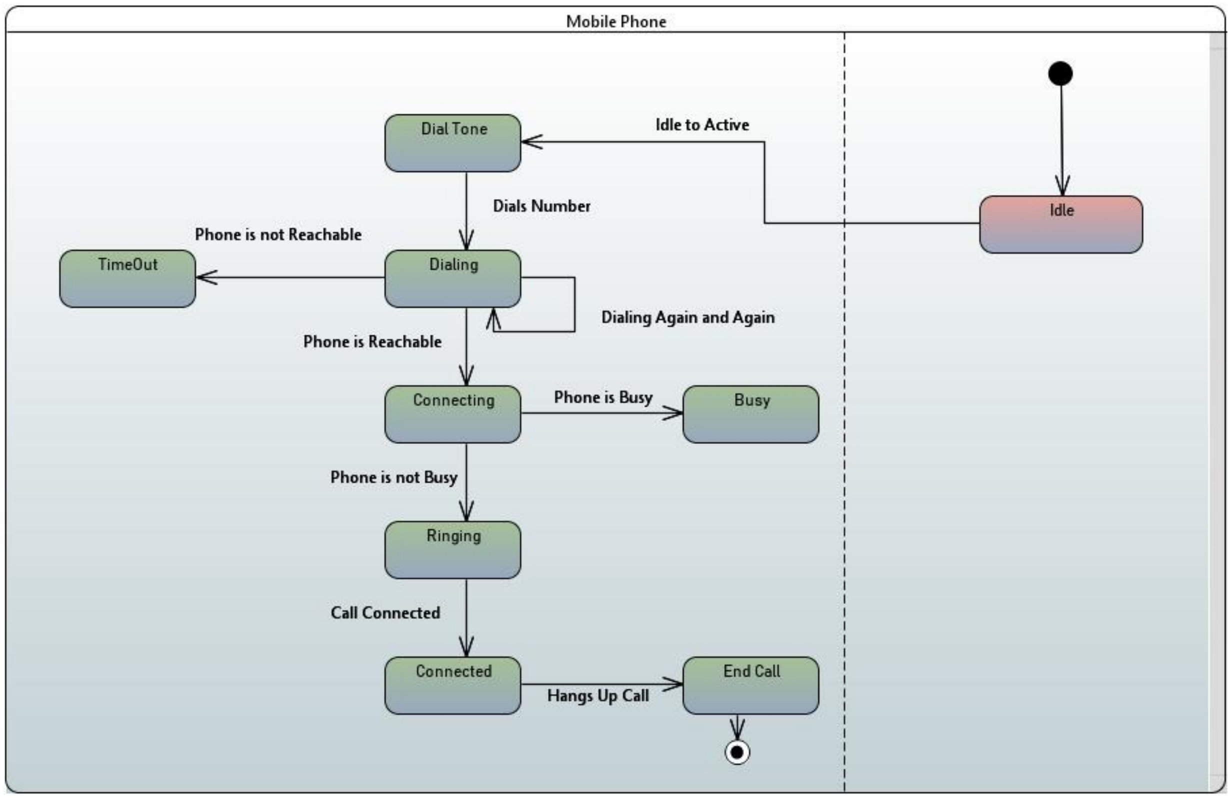
QUESTION 2 – STATE MACHINE DIAGRAM (MOBILE PHONE)

A mobile phone or cellular phone, is a portable telephone that can make and receive calls over a radio frequency link while the user is moving within a telephone service area. The radio frequency link establishes a connection to the switching systems of a mobile phone operator, which provides access to the public switched telephone network (PSTN). Modern mobile telephone services use a cellular network architecture and, therefore, mobile telephones are called cellular telephones or cell phones in North America. In addition to telephony, digital mobile phones (2G) support a variety of other services, such as text messaging, MMS, email, Internet access.

There are two main states of a mobile phone Idle and Active. Phone goes from idle to active when he receives any incoming call or turns on phone to dial.

Active state is divided into substates, dial tone states where a person dials a number on his phone, then phone goes in the state of dialing to reach out the other person and to make the communication, phone is not reachable then it goes in the state of time out state informing about the reason to not connect else it goes to the connecting state note that dialing can be performed again and again to reach out the other person. If the phone is busy it goes to busy state else into the ringing state, after ringing connection is establish and person start to talk on the phone and listen too.

DIAGRAM

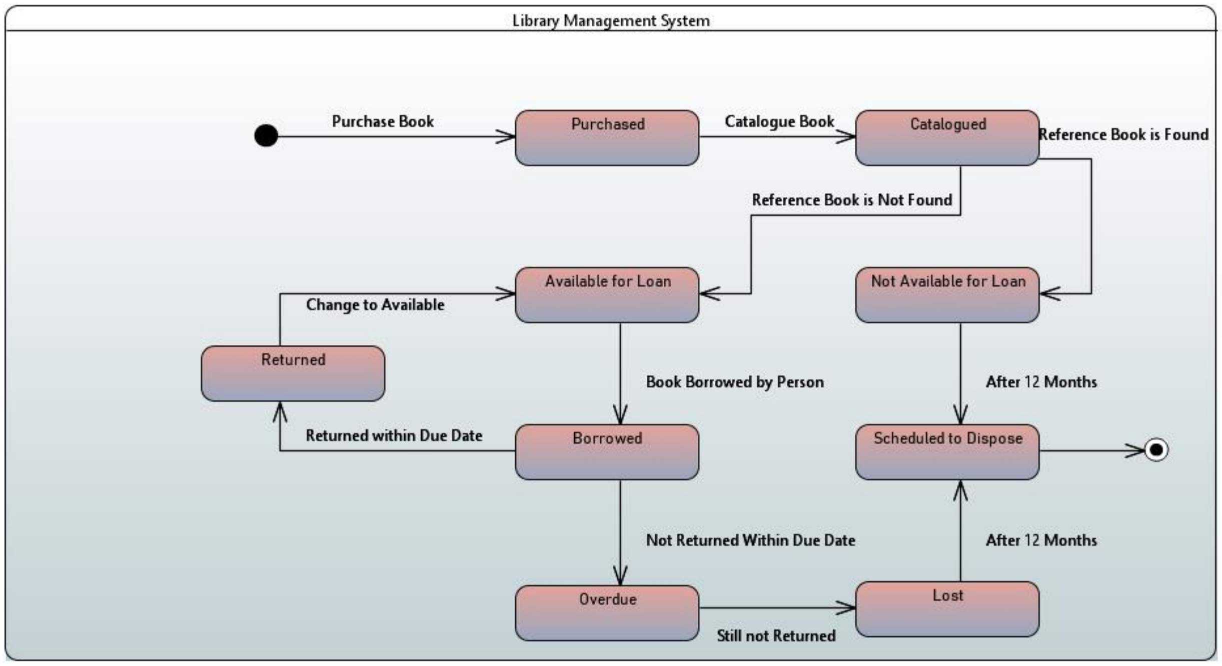


QUESTION 3 – STATE MACHINE DIAGRAM (LIBRARY MANAGEMENT SYSTEM)

Library management system allows management of a library where various books are borrowed by people. It allows efficient management of books 'borrow' status and keeps record of people who have kept books on a loan.

The library management system goes through various states. The initial state of LMS starts by purchasing a book and then creating it in the catalogue. Once the book is catalogued, It checks for any reference of the book ID. If any reference is found, the book in the system changes its state to 'Not available for loan' and then it's scheduled to be disposed of after 12 months. If no reference of that book is found, the book is available for loan. The library management system at this stage, allows any person to borrow this book from it's system and change the state of the book to borrowed once it has been taken up by any person. Once borrowed, If the book is returned within the return date, It's state changes back to 'Available for Loan'. If the book is not returned within the issued return date, The book is marked 'Overdue' and stays there for a couple of days if still it's not returned. In case, the book is still not returned after being overdue, It's state is changed to lost and the book in the system is scheduled to be disposed of after 12 months.

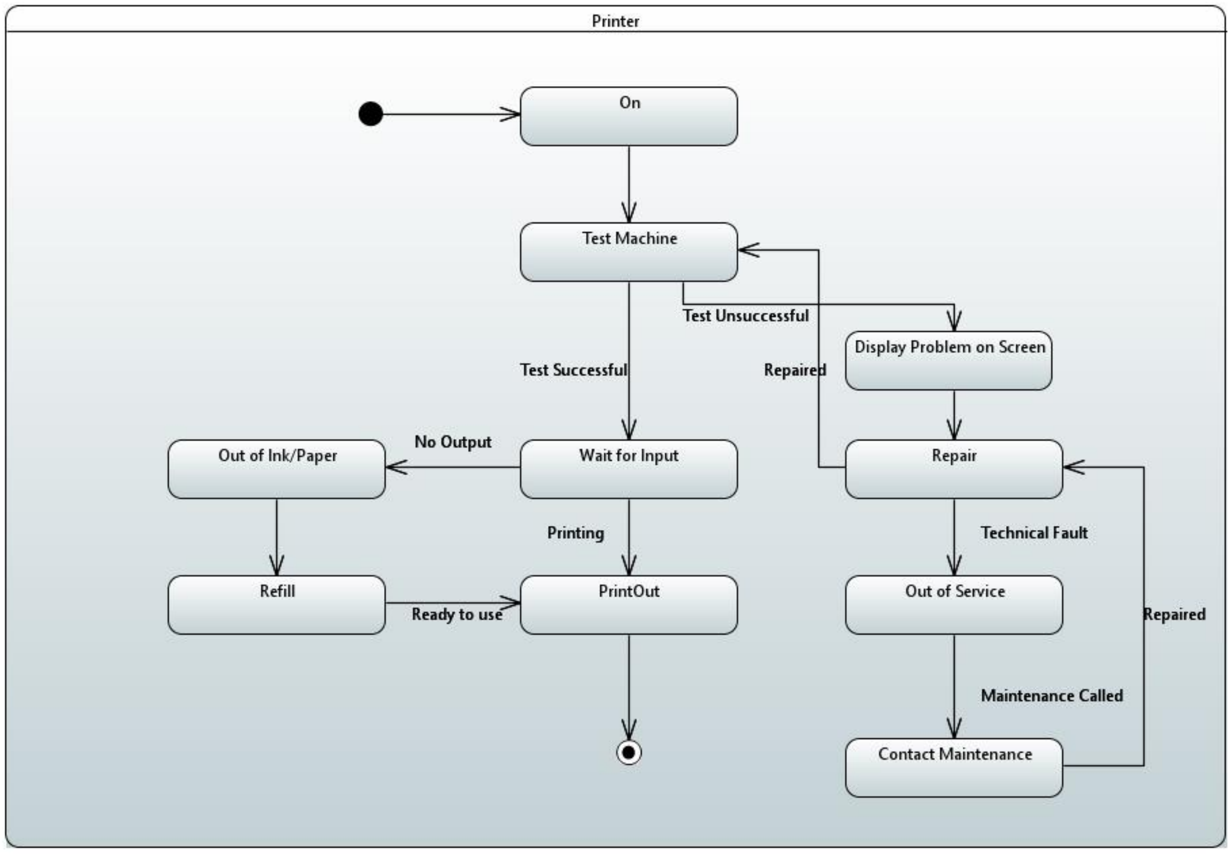
DIAGRAM



QUESTION 4 – STATE MACHINE DIAGRAM (PRINTING MACHINE)

Draw all the states that a printing machine goes through showing the transitions from one state to another with conditions.

DIAGRAM


Printer
On
Test Machine
Test Unsuccessful
Display Problem on Screen
Test Successful
Repaired
No Output
Out of Ink/Paper
Wait for Input
Repair
Printing
Technical Fault
Refill
Ready to use
PrintOut
Out of Service
Repaired
Maintenance Called
Contact Maintenance