CHAPTER 1

INTRODUCTION

The aim of the project is to create a code that implements a DFA. the thought is to implement it victimisation shopper and server program. The program takes string as Associate in Nursing input , and it ought to print the states the string goes through and prints whether or not the string is accepted by the DFA or not accepted by the DFA.

The client-server is enforced victimisation socket programming. The input is accepted at the shopper finish , this input is any sent to the server. The server accepts the input from the socket streams, and it runs the DFA module, here the string is checked for the validity consistent with the given DFA.

It shows all the states elapsed the string and displays whether or not the string is accepted or not accepted by the given DFA.

CHAPTER 2

DETERMINISTIC FINITE AUTOMATION (DFA)

2.1 INTRODUCTION

In the theory of computation, a branch of theoretical computing, a settled finite automation(DFA) additionally referred to as settled finite accepter(DFA) and settled finite state machine may be a finite machine that accepts/rejects finite strings of symbols and solely produces a singular computation (or run) of the automation for every input string, ‘Deterministic’ refers to the individuality of the computation. In search of the best models to capture the finite state machines, McCulloch and Pitts were among the primary man of science to introduce an idea of Finite Automation in 1943. A settled finite automaton (DFA) consists of:

1. a finite set of states (often denoted Q)

2. a finite set ∑ of symbols (alphabet)

3. a transition perform that takes as argument a state and a logo and returns a state (often denoted δ

4. a begin state usually denoted q0

5. a collection of ultimate or acceptive states (often denoted F)

We have q0 ∈ Q and F ⊆ Q

So a DFA is mathematically pictured as a five tuple

(Q,∑, δ, q0, F)

The transition perform δ may be a perform in

Q × ∑Q

Q × ∑ is that the set of 2-tuples (q, α) with Q ∈Q and α ∈∑2.2 DFA WITH TRANSITION TABLE

Figure SEQ Figure \\* ARABIC one Transition tableThe indicates the beginning state: here q0

The \* indicates the ultimate state(s) (here just one final state q1)

This defines the subsequent transition diagram:

Figure SEQ Figure \\* ARABIC two Transition diagram of DFAFor this instance

Q =

start state q0

F =

∑ =

δ may be a perform from Q × ∑ to Q

δ: Q × ∑Q

δ(q0, 1) = q0

δ(q0, 0) = q2

Example: word

When will the automaton accepts a word??

It reads the word Associate in Nursingd accepts it if it stops in an acceptive state

Figure SEQ Figure \\* ARABIC three Transition diagram of DFA to scan a stringOnly the word then is accepted

Here Q =

∑ is that the set of all characters

F =

We have a “stop” or “dead” state q5, not acceptive

2.3 however A DFA PROCESSES A STRING

Let us build Associate in Nursing automaton that accepts the words that contain 01 as a subword

∑=

L = x, y 2 ∑\*

We use the subsequent states

A: start

B: the foremost recent input was one (but not 01 yet)

C: the foremost recent input was zero (so if we have a tendency to get a one next we should always go

to the acceptive state D)

D: we've got encountered 01 (accepting state)

We get the subsequent automaton

Fig 3: Transition diagram to method a string

Transition table

Figure SEQ Figure \\* ARABIC four Transition table 2Q = , ∑ = , begin state A, final state(s)

2.4 APPLICATION OF DFA

Deterministic Finite Automata, or DFAs, have an expensive background in terms of the mathematical theory underlying their development and use. This theoretical foundation is that the main stress of ECS 120's coverage of DFAs. However, this handout can concentrate on examining real-world applications of DFAs to realize Associate in Nursing appreciation of the utility of this theoretical construct. DFA uses embody protocol analysis, text parsing, computer game character behavior, security analysis, electronic equipment management units, language process, and speech recognition. to boot, several easy (and not thus simple) mechanical devices area unit ofttimes designed and enforced victimisation DFAs,

such as elevators, peddling machines, and traffic-sensitive traffic lights.

2.4.1 peddling Machines

Figure one presents a DFA that describes the behavior of a coin machine that accepts bucks and quarters, and charges $1.25 per soda. Once the machine receives a minimum of $1.25, like the blue-colored states within the diagram, it'll permit the user to pick a soda. Self-loops represent unheeded input: the machine won't dispense a soda till a minimum of $1.25 has been deposited, and it'll not settle for more cash once it's already received larger than or capable $1.25.

To express the DFA as a 5-tuple, the parts area unit outlined as follows:

1. Q = f$0:00; $0:25; $0:50; $0:75; $1:00; $1:25; $1:50; $1:75; $2:00g area unit the states

2. ∑ = f$0:25; $1:00; choose is that the alphabet

3. δ, the transition perform, is delineate by the state diagram.

4. q0 = $0:00 is that the begin state

5. F =∅; is that the set of settle for states

Figure SEQ Figure \\* ARABIC five coin machine state diagram2.4.2 AI in Video Games: Pac-Man's Ghosts

Figure SEQ Figure \\* ARABIC half dozen Screenshot of Pacman's gameFinite state machines lend themselves to representing the behavior of pc controller characters in video games. The states of the machine correspond to the character's behaviors, that modification consistent with varied events. These changes area unit shapely by transitions within the state diagram. State machines area unit suggests that|on no account|under no circumstances|not at all|in no way} the foremost refined means of implementing by artificial means intelligent agents in games, however several games embody characters with easy, state-based behaviors that area unit simply and effectively shapely victimisation state machines.

Here we have a tendency to take into account the classic game, Pac-Man. For those unacquainted the game- play, Pac-Man needs the player to navigate through a maze, consumption pellets and avoiding the ghosts UN agency chase him through the maze. sometimes, Pac-Man will flip the tables on his pursuers by consumption an influence pellet, that briefly grants him the ability to eat the ghosts. once this happens, the ghosts' behavior changes, and rather than chasing Pac-Man they struggle to avoid him.

The ghosts in Pac-Man have four behaviors:

1. willy-nilly wander the maze

2. Chase Pac-Man, once he's among line of sight

3. scarper Pac-Man, once Pac-Man has consumed an influence pellet

4. come to the central base to regenerate

These four behaviors correspond on to a four-state DFA. Transitions area unit set by matters within the game. for example, a ghost DFA in state two (Chase Pac-Man) can transition to state three (Flee) once Pac-Man consumes an influence pellet.

Figure SEQ Figure \\* ARABIC seven Behavior of a political action committee Man ghostCHAPTER three

SOCKET PROGRAMMING

3.1 INTRODUCTION

Internet and WWW have emerged as international omnipresent media for communication and altered the manner we have a tendency to conduct science, engineering, and commerce. they're additionally dynamical the manner we have a tendency to learn, live, enjoy, communicate, interact, engage, etc. the fashionable life activities are becoming utterly focused around or driven by the net. to require advantage of opportunities bestowed by the net, businesses area unit endlessly seeking new and innovative ways in which and suggests that for providing their services via the net. This created a large demand for computer code designers and engineers with skills in making new Internet-enabled applications or porting existing/legacy applications to the net platform. The key components for developing Internet-enabled applications area unit a decent understanding of the problems concerned in implementing distributed applications and sound data of the basic schedule models.

4.2 CLIENT/SERVER COMMUNICATION

At a basic level, network-based systems include a server, client, and a media for communication

as shown in Fig. 13.1. A pc running a program that creates asking for services is termed shopper machine. A pc running a program that gives requested services from one or additional purchasers is termed server machine. The media for communication is wired or wireless network.

Figure SEQ Figure \\* ARABIC eight Client-Server communicationGenerally, programs running on shopper machines build requests to a program (often known as as server program) running on a server machine. They involve networking services provided by the transport layer, that is an element of the net computer code stack, usually known as TCP/IP (Transport management Protocol/Internet Protocol) stack, shown in Fig. 13.2. The transport layer includes 2 sorts of protocols, communications protocol (Transport management Protocol) and UDP (User Datagram Protocol). the foremost wide used programming interfaces for these protocols area unit sockets. communications protocol may be a connection-oriented protocol that has a reliable flow of knowledge between 2 computers. Example applications that

use such services area unit HTTP, FTP, and Telnet. UDP may be a protocol that sends freelance packets of knowledge, known as datagrams, from one pc to a different with no guarantees regarding arrival and sequencing. Example applications that use such services embody Clock server and Ping. The communications protocol and UDP protocols use ports to map incoming information to a specific method running on a pc. Port is pictured by a positive (16-bit) number price. Some ports are reserved to support common/well renowned services:

ftp 21/tcp

telnet 23/tcp

smtp 25/tcp

login 513/tcp

http 80/tcp,udp

https 443/tcp,udp

User-level process/services usually use port range price >= 1024.

Figure SEQ Figure \\* ARABIC nine TCP/IP computer code stack3.3 OBJECT oriented PROGRAMMING WITH JAVA

Figure SEQ Figure \\* ARABIC ten TCP/UDP mapping of incoming packets to applicable port/process Object-oriented Java technologies—Sockets, threads, RMI, clustering, net services—have emerged as leading solutions for making moveable, efficient, and reparable massive and complicated net applications.

3.4 HOSTS IDENTIFICATION and repair PORTS

Every pc on the net is known by a singular, 4-byte information processing address . this is often generally written in dotted quad format like 128.250.25.158 wherever every computer memory unit is Associate in Nursing unsigned price between zero and 255. This illustration is clearly not easy as a result of it doesn't tell US something regarding the content and so it's tough to recollect. Hence, information processing addresses area unit mapped to names like WWW.buyya.com or link "http://www.google.com" WWW.google.com, that area unit easier to recollect. net supports name servers that translate these names to information processing addresses. In general, every pc solely has one net address. However, computers usually got to communicate and supply over one sort of service or to speak to multiple hosts/computers at a time. as an example, there is also multiple ftp sessions, net connections, and chat programs all running at identical time. to differentiate these services, an idea of port s, a logical access purpose, pictured by a 16-bit {integer|whole range|number} number is employed. That means, every service offered by a pc is unambiguously known by a port range. every net packet contains each the destination host address and therefore the port range on it host to that the message/request has got to be delivered. The host pc dispatches the packets it receives to programs by staring at the port numbers specified among the packets. That is, information processing address is thought of as a house address once a letter is distributed via post/snail mail and port range because the name of a particular individual to whom the letter has got to be delivered.

3.5 SOCKETS AND SOCKET primarily based COMMUNICATION

Sockets offer Associate in Nursing interface for programming networks at the transport layer. Network communication victimisation Sockets is extremely abundant just like activity fi autoimmune disease I/O. In fact, socket handle is treated like fi autoimmune disease handle. The streams utilized in fi autoimmune disease I/O operation are applicable to socket-based I/O. Socket-based communication is freelance of a programing language used for implementing it. That means, a socket program written in Java language will communicate to a program written in non-Java (say C or C++) socket program. A server (program) runs on a particular pc and incorporates a socket that's guaranteed to a particular port. The server listens to the socket for a shopper to form a association request (see Fig. 13.4a). If everything goes well, the server accepts the association (see Fig. 13.4b). Upon acceptance, the server gets a replacement socket guaranteed to a special port. It desires a replacement socket (consequently a special port number) in order that it will still hear the first socket for association requests whereas serving the connected shopper.

Figure SEQ Figure \\* ARABIC eleven institution of path for two-way communication between a shopper and server3.6 SOCKET PROGRAMMING AND JAVA.NET CLASS

A socket is Associate in Nursing end of a 2-way communication link between two programs running on the network. Socket is guaranteed to a port range in order that the communications protocol layer will determine the appliance that information is destined to be sent. Java provides a collection of categories, outlined during a package known as java.net, to change the speedy development of network applications. Key categories, interfaces, and exceptions in java.net package simplifying the quality concerned in making shopper and server programs are:

The categories

ContentHandler

DatagramPacket

DatagramSocket

DatagramSocketImpl

HttpURLConnection

InetAddress

MulticastSocket

ServerSocket

Socket

SocketImpl

URL

URLConnection

URLEncoder

URLStreamHandler

The Interfaces

ContentHandlerFactory

FileNameMap

SocketImplFactory

URLStreamHandlerFactory

Exceptions

BindException

ConnectException

MalformedURLException

NoRouteToHostException

ProtocolException

SocketException

UnknownHostException

UnknownServiceException

3.7 TCP/IP SOCKET PROGRAMMING

The two key categories from the java.net package utilized in creation of server and shopper programs are:

ServerSocket

Socket

A server program creates a specifi c sort of socket that's wont to listen for shopper requests (server socket). within the case of a association request, the program creates a replacement socket through that it'll exchange information with the shopper victimisation input and output streams. The socket abstraction is extremely just like the file concept: developers ought to open a socket, perform I/O, and shut it. Figure 13.5 illustrates key steps concerned in making socket-based server and shopper programs.

Figure SEQ Figure \\* ARABIC twelve Socket-based shopper and server programming3.8 RUNNING SOCKET PROGRAM

Compile each server and shopper programs and so deploy server program code on a machine that goes to act as a server and shopper program, that goes to act as a shopper. If needed, each shopper and server programs will run on identical machine. for instance execution of server and shopper programs, allow us to assume that a machine known as mundroo.csse.unimelb.edu.au on that we wish to run a server program. The shopper program will run on any pc within the network (LAN, WAN, or Internet) as long as there's no firewall between them that blocks communication. allow us to say we wish to run our shopper program on a

machine known as gridbus.csse.unimelb.edu.au The shopper program is simply establishing a reference to the server and so waits for a message. On receiving a response message, it prints identical to the console. The output during this case is that is distributed by the server program in response to a shopper association request. It ought to be noted that when the server program execution is started, it's impracticable for the other server program to run on identical port till the primary program that is self-made victimisation it's terminated. Port numbers area unit a reciprocally exclusive resource. they can't be shared among totally different processes at identical time.

CHAPTER 4

IMPLEMENTATION

// A Java program for a shopper

import java.net.\*;

import java.io.\*;

public category shopper

non-public Socket socket = null;

non-public DataInputStream input = null;

non-public DataOutputStream out = null;

// creator to place information processing address and port

public Client(String address, int port)

{

// establish a association

try

catch(UnknownHostException u)

catch(IOException i)

// string to scan message from input

balkline = "";

try

catch(IOException i)

// shut the association

try

catch(IOException i)

}

public static void main(String args[])

{

shopper shopper = new Client("127.0.0.1", 5000);

}

}

// A Java program for a Server

import java.net.\*;

import java.io.\*;

import java.util.Scanner;

import java.lang.\*;

class dfa{

static int flag=0;

public static int Start(char c)

{ System.out.println("state: start");

if(c=='g') come 1;

else come 0;

}

public static int Q0(char c)

{ System.out.println("state: Q0");

if(c=='g') come 1;

else if(c=='o') come 2;

else come 0;

}

public static int Q1(char c)

{ System.out.println("state: Q1");

if(c=='g') come 1;

else if(c=='o') come 3;

else come 0;

}

public static int Q2(char c,int i)

{

System.out.println("state: Q2");

if(c=='g') come 1;

else if(c=='d')

else come 0;

}

public static int Qf(char c)

{ flag=1;

int state=0;

come state;

}

}

category professional extends dfa {

pro(String a)

{

//String a;

int state=0;

Scanner sc=new Scanner(System.in) ;

//System.out.println("enter the string\n");

//a=sc.nextLine();

char c;

for(int i=0;i