B.M.S COLLEGE OF ENGINEERING BENGALURU

Autonomous Institute, Affiliated to VTU



LAB REPORT

23CS3PCOOJ

Submitted in partial fulfilment of the requirements for Lab Bachelor of Engineering

in

Computer Science and Engineering

Submitted by:

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INDEX

Sl.No.	Title	Date		
1	Complete scanned Observation Book	12/12/2023 -		
	_	20/02/2024		
2	Lab 1	12/12/2023		
3	Lab 2	19/12/2023		
4	Lab 3	26/12/2023		
5	Lab 4	02/01/2024		
6	Lab 5	09/01/2024		
7	Lab 6	16/01/2024		
8	Lab 7	23/01/2024		
9	Lab 8	30/01/2024		
10	Lab 9 06/02/2024			
11	Lab 10	20/02/2024		

INDEX

.No.	Date Date	Title	Page No.	Teacher's Sign/ Remarks
		The state of the state of	AVERSE	
		Malara Maria Maria	- 4	
		Later Carlos Colonial	- 0314	
		and the set there	2 544	
	Depart	The State of the State of the	n	4-1-
	W 3 C 3 C	The Particular Manager		
				100
				FITTER
				The state of
		ALL AND DESCRIPTION	100	
	To be to	The second second		A SECTION

· Parse Int class Bestangle Assa (Public static void main (string arge []) no length, breadth; length - Integer parent large (05) breadth - Integer parent al (args [1]); not area = length " breadth; System, out, point to ("length of rectangle z" a long System. and pointed "broadth of exchange 2" + broads System out print in ("area of rectangle = " + area autant javac Bestangle Asea java java Pectargle Asea 10 8 length of rectangle=10 bradth of rulargle = 8 area of seed angle = 80. Scanner import java util Scanner class Hello World (public static vaid man (Stong augs I) ind a; flood b; stoing s; Scanner in - new Scanner Cyslem, in t on OnePlus and protto ("featon a strong") red by Triple Camera

[Detai 5 - in next Line (): System and points ("You entered attering"+5); System and points ("You entered on integer"); a = in, and Int (); System, aid, proof in ("You entered integer "+a); System out protes ("Earter a floor"); b = in, next Float (); System and pointles ("You enloud flood + b) 3) Factorial of a given number class Bestowal (public state void main (string cogs ()) ind fac = 1; System out point in ("Einter a number:"); Scanner sc - new Scanner (System. in): ind n= sc. next Int (); for (int ==1; [(=n; [++) (fac - fac i; System and point in 1 The factorial; "+ fact) Palindrame Class palindriams (Public static void main (Storing oversil) nePlusnot n. t. rem, rev - 0;

Frances so : now Scanner (System in); Syllen, out, posselle (" larder a 5 digit number.] n = 51, nead Int (); entrile (tro) 200n = +-1 10; rece - tere 10 + reen; t= +/10: ((ever == n) (System out prod in ("Palis down"); system. out pound on 1" not Palindrane"); Sum of digital class sum of digits (public state void man (Storng args []) (long number, sun; Scanner SCI new Scanner (System in); System. out . point ("Eenter a 5 - digit number) Aurotour = Sc. Cext Long (); for Cum : 0; Auber ! = 0; Rumber = number / 10) sum - sum + numberil, la; System out proble (Sum of cligite: " + Sum);

Arrays -10 Class Auto Array (
public static word main (5tring augs ()) (ad month - days [7 = (31, 28, 31, 30, 31, 70, 31, 31, 30, 31, 30, 21}; System out privater ("April has" + month 7) Type Convertion clay promote (Public static rord main (Storng augs []) byte b=42; chart- 'a' Short 5-1024; float f = 6.77 g: diouble d = 0.1234; double robult = (f" b) + (i/c) - (d's). Syden , out . pointly (Cf b) +" +"+(i/c)+" + (d's)): doubte sunt = (B°b) + (i/c) - (d's).

12/13/83 Quadratic Eguat on import java, util . Scanner; dan Duadratie and a, b, c; decible 211, 22, d: void getd () Scanners : new Scanner (System in) System and point by Conton the coefferent of a, b, c"). a=5, next 2nt (); D- 5, and Int (). (= S. Next Int 1). void remputel) while (a==0) System out protes ("Not a quadrate out System out . Point in l'Eenter a non zero valu Box a: "J; Scarner 5 - New Scarner (Syttem ; n); a = S. geact Int (): d-b*b-4'a'c if (d==0) 21 - (-b)/(2°a). System out . print to l'iRocate are real and System, out puntles ("Root 1-Root 8 = "+ 24)

Bafna Gold ele if (dro) 81 = ((-6) + (moth get (d))) / (double) (24) 88= ((-b) - (Math, squt (d))) (clouble) (2 a) System and produce ("Roote are not and distinct System went partle ("Root 1 - "+ 21 + "Root 9 - " else if (dco) System, out print by ("Root, are maginary" 81 = (-b) 1 (2"a); 82 - Math squit (-d 11 (2 a): System out print la ("Root 1 = "+ &1 + " + i" + N2 System , cent . prod lo ("Rest 1 = "+ & 1 + " - ; " + & 2). clay Quadrati Mais Public statie void man (String augili) Quadratic q - new Duadratic (). 2. getd(); 2. (empute ();

Output i) letter the coefficients of a.b. (: 1-3 8 Roote and dutinet Reat 1 = 2 Root 8 = +1 ii) Enter the coefficiente of a bot Not a quadrati equation Rentin a non zero value of a (ii) leater the coefficient of a.b. (Root are real and Equal Reat 1 = Rot 0 =-1 Civy Eester the coefficient of a.b. 1 1 8 Roots one imaginary Paul 1 -00+10382875 Bat 8 = 0.0 - 10.399875

19-17-03 Java Program to create class (fulent with murky usa, name, Calculate SCals of student =) import java utd scanner; class subject (I'd oredity! not grade; Public class strated 4 Subject [] subject; Story names string usos double SGIPA: Scanner S; Student () Subject : new Subject [9]; for (trosic = 9:, 1++) subject [i] - new Subject (): 5 - new Scanner (System in); public void get Studies Detailes () System out , point ("Enter Name:"); name = s. neather (); System out pour CEnter USN. USA- s. next (); public void got trans () Box (TED! TEB: Tex)

Bafna Gold -

Syclem, and print (" Eighter the Subject Make + (T+1) +":"). subject [i] subject Marky = 5. mothers (). System. Out point (Fester the Couditit (+1) subject (i), coudily = 5. next Int (); white (subject [], subject Marked 100); System out prent to (" Marky antoned are invalid, lenter the Marks in between 1 to be else : f (Subject (?) , subject / taxtres = 90) Subject [i]. grade = "10"; else of (Subject [] Subject Hanked = 80) Subject [1] grade = "9" also if (Subject (i) subject Marky) = 70) subject [i], grade = "8" eles if (subject (3) dubject ranky) - 60 Subject [] grade - 7' elsif (Subject [] Subject touts 5:50) Subject [7.9 rools = "6"; elect (subject (1). Subject Marky > - 40)

Subject [i] grade = "0"; public void compute SCOPA() double total Gredity = 0; double total Grade Pante = 0; Box (int = 0: 18; 18) total bradity in subject () wedite: tolal grade Point + - Subject [i] grade "subject [:]. oudity; SGIPS = total grade Portal total Gradily; Public state void man (String (3 avgs) Student SI = new Student (): 51. get Stedert Delailer (); SI get Marke (); SI. compute (CaPAC); System ent print lat "Name; "+ 31. Name) System, and pount in ("USN: "+51, USN); System, and pantle ("SORPA: "+ SI. SORPA);

Output Gorton Name! Prajusal C Exten USW. 1BM 82C5192 Renter marky for subject 1: 29 Genter credity for subject ! Easter marke for 86 Enter credity for Enter marke for Penter marke for subject he 90 Penter Oredity for Subject 3: Enter marke for subject 5; genter Gredete fox subject 5: Enter month for Subject 6:

Bafna C leater marke for subject 7. Enter mante wooded for subject ? Enter marke for subject 8: Genter credite for subject 8. Name: Prajusal C USN: 1BMODGET98 SGPA (9.25

26/10/03 Oceate a clay Book which contains from members, name, author, Price, num page. Include a corretourton to ad the value for the members, Include methods to ast and get the details of the objects. Include a to (ting() method that could display complete details of book Develop a Jama program to create a Book of de import jouen, util scanner Clau Book String game: Strong author; ord Poice; int num pager; Public Book (String name, String author, of poice, not numpages) this name - name: this, author - author; this poice = poice; this our pages - our Pages; public string to string () Strong name, author, price, numloger name - Book game:" + How name = "sethor name:" + the authors price - "Price: + this price + "10" num pages - Number of page: - the. Pagu + 10". seture name + author + Paice + num Page; public clay Mais! public static void main (Storng & 3 augs & Scanner 5 - neue Scanner (System. in); Stong Dane; String author ird parces nt our Pages; System, out point in (" Easter the number of brothis) 1 - 5 mod 2 of (); Book [36 - Down Book [n]. for (ind = 0: (n; i++) (System and proof to (" Easter name of book:" name = s. next (); System, and point do (" Einter author of book:") dultor = 5 need O; System out point in ("Benton poice of book !" poice = = need int (); System, out, Point in (" Easter the number of Pager of book: " Rumpagu = 5. next Ent (); bris - new Book (Frame, author, porce, numpy) System. Out. Pant La (b (i). to Story (U);

Output Renter the number of books: Enter name of book: Einter outhor of book: Easter the poir e of the Book. Easter the number of page of book: Enter name of the book: Enter authour of book: Center the poise of book: Eater to number of pages of book! Book nam: AuthorBoat name: Alumber of page : 450 Book Name. x Author pame: The number of page : 300

Bafna Gold of Develop a Jane Program to create an abstract class named stage that contains two integers and an empty method named print Area () Bounde druce classes rained Rectargle, Triangle and liede such stat each ear of the classy entends the class shape. Each one of the classes contain only the method Point Axe () that points the asue of the given shape import java, util, sanner: abstract day shape (int length: not breadth; abstract void point Axa (); class rectangle extends shope (void pring thea () (Scanner 51 - new Scanner (System in) System, out pound to ("Genter the dimension of the rectangle (length and breadth): "). length = sc, next int (); bradth = sc. need int (). system out print In ("Axa of rectangle is" + (length " breadth)); clay triangle extends shape & word grad Axa (){ Scanner (System in)
System out part to ("Earles storigth and
broad to of entangle "). length - sc nest int (

breadth = sc, next, od (); System out print in ("Asea of Leiangle 3 + (o.s. longth breadth); class wich extends shape (werd point Ada () f Scanner Scanner (System in); system, and print la (" Enten vadine wicle: " length = SC. good out (); System out pard to ("Axa of Circle is" + (3.14 Mergth - length)). public class man (public Hatic vaid man (String [] avgs shape - shape; shape : new Rectangle (); Shape, point Axa (); Shape = new Throngle (); stape, prod Asta (); shape - new Gircle (). shape post Asca ();

Output Enter the dimensions of the sectangle (length and breadth): Chase and height); Enter radius of circle; Asea of Rectangle :5 6.0 Asea of triangle is 4.0 Asea of Circle is 28, 259999

Vevelop a Java poogram to create a clay Bank that maintain two hinds of account for its cultamery, one called savings account and the other current account. The sawings account proveider compained interest and with document facilities but no cheque book facility. The circust account preceides cheque book facility but no interest account holder should also maintain a minimum Solance and if the balance felly below this lived, a Oberneice Charge is imposed. · Cenale a class Account that story customer name, account number and type of account. From this deserve the classes Con-acct and Save - and to make them more aprifice to their requirements. Include the receivery methode norder to achieve the Collowing tasky: as Accept depoid foram customen and update the balance. b) Display the bolance Compute and deposit stead d) Premit withdrawgk and update he e) Check for sol minimum balance, imprese populty of recurry and update the Dalance

import jana idil, scanner. class Scands String automorNome; int account Alumber strong accountlype; double balance! Account Cotony untomer Name, not account Mumber, strong account Type, double belonce) (this automorName = customer Name: this account Thumber - account Mumber, this account Type - account Type; this balance - balance; void deposit (double amount) (balance + - amount; System out parter Colepaid of " + amount , " succusped"); void diglay Bulance Of System, out print la ("Balance" + balance); void with draw (double amount){ if 1 balance = amount (0) (System and paint to ("I roufficient balance"); balence - - amount Sydem, out pretty ("letth drawal of" a mount

+ " successful "); clay Suring Account Caterda Account (Sowing Account (Story Contamen Name account Number, strong account Type, double below { super (Cutemen Name, accord Number, accord Type, balance). void compound Interest () (double rate = 0,05; double time = 1.0: double interest = balance nath. peur (1+ rate, time) - balance. balance + - interest System out print in (" Interest esf". interest + "addled"); void with deans I double prount) { if (balance - amount Lo)} Tystem and protter ("Withdraweld" amound + "successful"); class Convert Account extendy Account } double minimum Balance - 1000; double derueia Charge = 503 Current Acasest (Strong automen Mane,

int account Number, stony account Type double balance 1 (account Type, balances; void withdraw (double amount) (of (balance - amount 6 minimum Balance) I Tythen, out protes ("I sufficient below"); balance - - amount System and , point in 1" Whitnoward of "+ amount + "succenful"); void impose service Change () of (balance & minimum Balance) & balance - : servere change; + service Charge +" impound " public Clay Back! public static void mais (Stong (Jorgs) Scanner gearner = new Scanner (Sythen, in); System, out print (Einter audomin nane;). String automa Name = Scanner, next (); System. Out. pourd (Genter account number int account Number = scanner. need Int U; System out point ("Eester account type Camera

(saving / Current); "); Stong account Type = scanner, next () System out purt low Penter initial batrices double balance = scanner, next Doubles Account account; of Kaccound Type, equal (Savery) account : new Saverings Account (underen Name, account Number, account Type, balance); account - new Coverent & Karent Contomor Name, account Minher, account Type, balance I; conte (fece) { System. Out printle (101. Deposid) System out, partle ("& Osplay balance") System out print h (3. Compute and deposed interest "). System ent out in I'h, with alrami); System out point in ("5. Exit"). System. out print (Enten chaire:); por chain - scapper. road Int (); suitch (chaire) (System out point to ("Penter amount Sylan, and print. double arrent - scorrer rout Dable

Plus

account depoit (ancent); break; account: diplay Belonce (); if (account intance of soung Account) { (Saving Account) accounts. Compressed Interest (); System went point la C'Interest not areaidable for current account "I. boeah; Couly: System , and port ("Easter amount to with draw : "); amount - scanner, next Double (); allows with draw (amount). if (account indance of lewould Account) (((Curred Account Jaccount), impose Service Change (); bacah! cares! System exit (O);

Quitant Center automer name: Pagical Renter account number: 198 Earter account type (savings (Circurs); Enter socital balance: 1700 1. Depoint a. Diplay balance 3. Comparte and deposit intered 4 litth decare 5. Exit Enter chaire: 4 Enter amount the weith chave: 500 withdrane of 500, 0 succenful Enter chaire: 2 Balance; 1200.0

16-1-24 Practice Programs: strong Mandling (output) 1 11 strong constructory BASCE BASCE 0) 11staing length, atting literal, string concat A year has 50 weeky 3) To storng (), charact Person & name = 'John' age = 05) , b y) get chans () 5) get byte (), to char Adday () Brosce equale Brosce - teme Bonsce equal College -> false
Bonsce equal Bus(F -> false Brisce equal Egnore con BriskE - Ince region matchy () substring is matched

Standwith() 9) end swith () 10) equale () versus would equale would - true world == world + falu (1) compareto () Malphabete Bree Ice jug queen 200

Bafna Gold -Mountery 18) compare to () 13) Substring (), rdea of () Thur as wear a Led . This as wear, too This wear a deed. This as wear , too The 15 a text. Then as wear, too This is a text . This was fore Thur is a fed . This is , too 14) concat() hello wereld 13) replace () 1 ammege 16) Low () Hello Friends (3) Student Remorely anto detaily for stident 1: Regident on number: 18 Full Name: Ajay Dometer: 2 COPA: 9.15

Shederat Record; Registration Munker: 18 Full Name: Ajay denuter a COPA: 9.15 18) String Buffer After det length (5): Hells character at index 0:11 After det char At (0, 'X'); vallo getchan (0,5) · xello 19) Bord Dema Eagle Action:
Fagle & sleaving high in the only Nauch Schoon: Nauch is glisting showingh the air Nauch make a sharp coy: 20) Stape Demo Circle Asia = 78.5398; Perimeter : 31,418

Lab6 Create a package CTE which has two dancer-Student and Intervals The class attendent trans members like uso, name, sem. The clay Internale desired fewer student how an arriay that stores the Internal marks scarcel so fine course of the current correction of the attendent, breate another package SEE which has she class External which is a derived clay of Student. This clay how as array that storm the SEE marks scored in fine courses of the current serouter of the stident Import the tree packages in a file that declare the first works of a student in all fine courses. 11 student jana =) Pachage STE impost jace, will scanner; public Clase student postetled strong usn - new Storing (); protected string name - new Stoing (); protected and semi public void spend Buderd Delauter () Scanner 5 - new Scanner (System, in) System and proof by ("Easter the USA"); U10-5, next / (); System out part In 1 Einter She student Dame name 5, next hore (); Siglen out part la ("Early the semule;") Jen = 5, next Int (1; Camera

public reid duplay Sudial Octaber C System out prot la l'usa = "+usa). ystem out period to 1" Student name System at purtle ("Semules =" + sen); 11 Talenal - jaug Package (IE; import (S.E. Student) import javea util. 5 carner. Public Clay Internale extends Student probabled of marky [] - new fort [5]; public Soid input () Franky () Scanner 5 - New Scanner (System, in); System out print in (" Earlow she mark of each subject "J. for (int :=0;165; 1++) marks [i] - 5, next Int (); 11 Externel jarea Package SEE; most OF Johnsy; mport gover. Ail Scooner;

public don Estorale extende Vaterrale Protected and marks (). public void orget SE Emarky () Scanner s = new Scanner (system, in); System , out print ("Subject" (i+1)+" marky (:3 - 5. next Ind (); Public void calculate First Marks!) for (int 1= 6; 165; 1+1) public void display Final Marche () diplay Huderd Octaber x (int :=0; ics : 1++) System and, pounter ("Subject" + (i+1)+

import SEE externali; clan Mais Public Stativard main (Sto, ng runge ?) ort nur of students - Q; External final Market 3 - neue External Cour of Stidente S; for Cot 120; [num of Skudenti : Tel) fired rocke (i) - new External (); Biral Harty [:], input Student Delaiter (). System out printle ("Easter OF monthis). fired tracks [i], mput (IF marky (); System and pound in (Einter S.F. F. marky). final Marke (1) . sput SFE marke (); System. out pount on 1" Displaying data: \n);
for lint :=0; 12 run of Student; [++) final Marky (i). (alculate Final Marky (); final Marky (i). deiplay Final Marky ();

Output Enter the USA Enter the student Name Praguest Enter the semuter Easter (JE marky Enter the marks of each subject 47 Foter SEE marky: Subject 1 months: 43 Subject & marky: 46 Subject 3 marry: 48 Subject to marky: 47 Subject 5 monty 46 Enter the USA Penter the Hudert name Anagha Earles the someter lenky Cot E marky Senter the mostly of each subject 44

Sealer SEE marky Subject 1 Marky: 45 Subject a rearchy - 44 Subject 3 North: 66 Subject a Marke: US Sugar 5 transa: 42 Diploying Data: USN = 1B1 22CS198 Student name - Prayward Semester 3 Subject 1: 72 Subject 9: 75 Subject 2: 69 Subject 4:81 Subject 5: 74 USN = 198 Stedent name = Aragha Semutes - 3 Subject (= 93 Subject 0 - 85 Subat 3-84 Subject 1- 87 Subject 5 - 89

Write a program that demonstrates handling of exception in interitance true. Greate a base day aller "Fother and derived clay alle " son" which extends the base class In Father clay, implement a continuetor which taky the age and threesen the exception library by () when she speck age 10 sr Sanday, emplement a construction that came both fother and son is age and thrown an exception if some age is I - fatheris age import farea . idel. day Whong Age extende Expertion (Weng Age (Storng mouage) { super (mestage); clau Father 6 int age; Father (intage) thrown Whong Age the negotive is this age : age; class con extendy Falther (

Son and father Ager int son Age Shraue Weing Age if Con Age S- father Age than fathery age is dream now this sage = sanAge's public class Er var & public State void mais (Staing aug () System, but paint in ("Eenter the dedty not a = sc. next Int (); Father father = new Father (a); System, out, punt by ("Earlier the ind b = sc. next 2nt (); son son a new Son (a, b. cotch (whong Age e e got reusage ();

Output Enter the Follow age Easter the Scene age Sentage is 84 Renter the Fathers age Enter the Sien age Sons age cannot be grown than father age Enter she father age Enler the soon age Seem age should be less than fathers age 31.01.24

6/2/24 Pgrim 8 public day Thread Example (Public glatic void main (string (] args) Thread thread 1 = new Thread (new Display Enery Ten Seconde (): Thread thread & - new Thread (new Display Genery Two Seconds ()); Shound 1, Start ()' Shread &, Start (); Class Display Every Ten Secondy implements public void run (white (true) Thread sleep (1000); System and printle (Bris college of Engineering "); I catch Galovapled Ecoptron e G. port Hack Trace ();

Totalum Com SPAR clay Diplay Every Tree Secrety replements Russable (public Void ton 1 chile (true) Thread, Sleep (2000); catch Conterrupt Exceptione e. pourd Stack Trace Output 100 CSE CSE CSE BAS College of Engineering CSE CCE CLE BMS College of Engineering CSE CSE CSE LSE ons callege of Engineering

Agrania clay Q boolean value Set - falu; Synchronized not get UK Every (Walne Set) System and print to (" \n Consumer blanting) weat (). Cotch (Interrupt Exception e. System and prontes 1 notify) Sylle out gridth (brot System out. printly ("In Intimate Bedung Va"1. nother (); setures no Synchronized word put (min) (Exchite (value Set) System out print la (" la Podewar wally la) System out protes ("Interrupted Fraption Cought") hy 0-0'

Bafna Goldvalue Set = Jene! System. and, product "Rd" + n/ System cent pendlo ("In Intirate Commental Clay Poedwer implements Rumables Bradiner (Q2){ New Thread (this, "Produces"). Stand () peblic void wat while (icis) (q. put (1++); Clau concurrer implemente Rumable (Consumer (Qg) 4 this 2 - 2; Dew Thread (the, "Conumers"), start (); public void nun ()(watch (1215) (ind 8 = Q.gd (); System out print in ("conumed "+ x).

notify ();

nd 5=0;

publistati void new (stong args (3) (reve Boducer (Q); new Consumer (q) Silver out prod la C Ben Control -Pau Control -1 to stop Totimete Conumer Produces weating Got = 0 Intinate Preducer Internate concurrer Producer weating conjunio 0 Get: 1 Intimate Producer Consumed: Put. 2

Veadlock synchronized void for (Bb) { Stowy name. Thread, current Thread (), gd Name (). Extended print la 1 name + "entered A for " Thread , sleep (1000); } catch (Exceptione) { System our printer ("A Intercripted "/s System and pound in Coame , " Lying to call B. lout U"17 - 6. tout (): void leut ()k System and paid to (Trude A. last "); Synchronized void bor (Aa) Stely nam Thread award Thread O. get Name (); System out, peund in (name & "entered B. ban") Thread, Sleep, (1000) later (Exceptione) { System and purtle ("B Entiropped") System out part la (name, "Lying to cal D. laut U' / a lest ()

asayna Croid

Sylem and punt 10 ("Touch A lant"). dan Radbih implemente Russable da news() Ob- new BL) Deadlock 1)1 Thread current Thread (1. Set Many (at Thread 1 Thread to new Thread of this, Boing These 1. 5 trot () a fee (b); Geten out purtle ("Back in main thread public vod sun ()(b. bar (a) System out part la ("Buch in other thoused") public state void man (stong ange [] new Read Lock (): Main Tround entered A for Racing Thread entered B bar This Thread bying to call De last Back in frein Thread lawy Thread trying to call x latel

Back in other shread

Pour 9 import janax suring - i import java and import javea and eroad. ". day Swing Dinas Swing Drone () Thrame if xon - now It rome (Rquet, Duch App Equat 1); John set Size (275 15a): Spring, Set layent (new Flow layent ()). 5 Burn , set Default Close Operation (5 Frame END ON-CLOSE); I label, lab - row Thitel (Equal; Forter the distiden and divident; Equat;); That Field at 6 - New Treat field (8); Trad Field bith = now Trend Freld (8); JBilton Multon - new TBillon (Egist, Calculatione. 8 quot !) Ilabel ever new Tabell); Tabel alab - new Tabel (). Tabel blab = new Tabel (); Trabel andab - reve Itabel () ifon add (ev) j from add (jlab). j from add (af if) iform, add (bill) of add (button). ffrm add (alab). ePlus ifem, add (bbb);

ifin add langabl. Action bestever 1 - new Action listeners () & public word action Performed (Action Event System wit purtle (liquet, Atron award from a text Reld Equet :). ailf add Action likeous - new T (1) bill add Action litteres (1); butten, add Act on listener (new Action literal) Able void action Redormed (Action French ent) Lory L inta Integer, Parcellal (agh, got Tearl () mot b - Integer Parental (bith get Text W). id an alb: alab. Ed Text (Equal :) NA : Equal ; al. plate set Tead (Eguat: \nB: & qued: + b); anilab. set Teat (Laguest; In Am - Egred ; and: Calch (Mumber Fournet Exaption e) alab. Sed Tead (Rqued; Lquet;): blab. Set Text (& quet; & quet:1; andab, ad real (Egled; land;) ean set Tead Organs, "Folio Only Lategers! Egfut); catch (An themetic Exception e) (also set Tort (& quet : & quet : 1:

what setting (Equal; Equal); and lab set Test (Squat; Equal;); you (Equal); of from ded Vichle (Iree); public static word main (Strong angel I)/ public void res () Den Swing amo (); Output Enter the divider and divident:

Develop a Java program that prints all real solutions to the quadratic equation ax 2 + bx + c = 0. Read in a, b, c and use the quadratic formula. If the discriminate $b^2 - 4ac$ is negative, display a message stating that there are no real solutions.

```
import java.util.Scanner;
class Quadratic
{
int a, b, c;
double r1, r2, d;
void getd()
Scanner s = new Scanner(System.in);
System.out.println("Enter the coefficients of a,b,c");
a = s.nextInt();
b = s.nextInt();
c = s.nextInt();
}
void compute()
while(a==0)
{
System.out.println("Not a quadratic equation");
System.out.println("Enter a non zero value for a:");
Scanner s = new Scanner(System.in);
a = s.nextInt();
d = b*b-4*a*c;
if(d==0)
```

```
r1 = (-b)/(2*a);
System.out.println("Roots are real and equal");
System.out.println("Roo1 = Root2 = " + r1);
}
else if(d>0)
{
r1 = ((-b)+(Math.sqrt(d)))/(double)(2*a);
r2 = ((-b)-(Math.sqrt(d)))/(double)(2*a);
System.out.println("Roots are real and distinct");
System.out.println("Roo1 = "+r1 + "Root2 = "+r2);
}
else if(d<0)
System.out.println("Roots are imaginary");
r1 = (-b)/(2*a);
r2 = Math.sqrt(-d)/(2*a);
System.out.println("Root1 = "+r1 + "+i"+r2);
System.out.println("Root1 = " + r1 + " - i" + r2);
}
}
class QuadraticMain
{
public static void main(String args[])
Quadratic q = new Quadratic();
q.getd();
q.compute();
}
```

Develop a Java program to create a class Student with members usn, name, an array credits and an array marks. Include methods to accept and display details and a method to calculate SGPA of a student.

```
import java.util.Scanner;
class subject{
int subjectMarks, credits, grade;}
class Student {
  String name;
  String usn;
  double SGPA;
  Scanner s;
  subject subjects[];
Student()
{
int i;
subjects = new subject[9];
for(i=0;i<8;i++)
subjects[i] = new subject();
s = new Scanner(System.in);
public void getStudentDetails(){
System.out.println("Enter student name:");
name=s.nextLine();
System.out.println("Enter Student USN:");
usn=s.nextLine();}
public void getMarks(){
int i;
for(i=0;i<8;i++){
```

```
System.out.println("Enter marks of subject"+(i+1)+":");
subjects[i].subjectMarks= s.nextInt();
if(subjects[i].subjectMarks>=40&&subjects[i].subjectMarks<=100){
subjects[i].grade=calculateGrade(subjects[i].subjectMarks);}
else{
System.out.println("Invalid Marks. Marks should be between 40 and 100");}
System.out.println("enter credits:");
subjects[i].credits=s.nextInt();
}
}
public int calculateGrade(int marks){
if (marks > = 90)
return 10;
else if(marks>=70&&marks<=80)
return 9;
else if(marks>=60&&marks<=70)
return 8;
else if(marks>=50&&marks<=60)
return 7;
else
return 6;
public void computeSGPA() {
     int totalscore = 0;
     int totalcred = 0;
     for (int i = 0; i < 8; i++) {
       totalscore += subjects[i].grade * subjects[i].credits;
       totalcred += subjects[i].credits;
     SGPA = (double) totalscore / (double) totalcred;
```

```
class Stud{
public static void main(String args[]){
Student s1=new Student();
s1.getStudentDetails();
s1.getMarks();
s1.computeSGPA();
System.out.println("Student name:"+s1.name);
System.out.println("Student usn:"+s1.usn);
System.out.println("Student sgpa:"+s1.SGPA);}
}
```

Create a class Book which contains four members: name, author, price, num_pages. Include a constructor to set the values for the members. Include methods to set and get the details of the objects. Include a toString() method that could display the complete details of the book. Develop a Java program to create n book objects.

```
import java.util.Scanner;
class Book {
  private String name;
  private String author;
  private double price;
  private int numPages;
  public Book(String name, String author, double price, int numPages) {
     this.name = name;
     this.author = author;
     this.price = price;
     this.numPages = numPages;
  }
  public void setName(String name) {
     this.name = name;
  public String getName() {
     return name;
  }
  public void setAuthor(String author) {
     this.author = author;
  }
  public String getAuthor() {
     return author;
  }
  public void setPrice(double price) {
```

```
this.price = price;
  }
  public double getPrice() {
     return price;
  }
  public void setNumPages(int numPages) {
     this.numPages = numPages;
  }
  public int getNumPages() {
     return numPages;
  }
  public String toString() {
     return "Book Details: \nName: " + name + "\nAuthor: " + author + "\nPrice: INR" + price +
"\nNumber of Pages: " + numPages;
  }
}
public class Main {
  public static void main(String[] args) {
     Scanner scanner = new Scanner(System.in);
     System.out.println("Enter the number of books: ");
     int n = scanner.nextInt();
     Book[] books = new Book[n];
     for (int i = 0; i < n; i++) {
       System.out.println("\nEnter details for Book " + (i + 1) + ":");
       scanner.nextLine();
       System.out.println("Enter name: ");
       String name = scanner.nextLine();
       System.out.println("Enter author: ");
       String author = scanner.nextLine();
       System.out.println("Enter price: ");
       double price = scanner.nextDouble();
```

```
System.out.println("Enter number of pages: ");
int numPages = scanner.nextInt();
books[i] = new Book(name, author, price, numPages);
}
System.out.println("\nDetails of all books:");
for (int i = 0; i < n; i++) {
    System.out.println("\nBook " + (i + 1) + ":\n" + books[i]);
}
scanner.close();
}</pre>
```

Develop a Java program to create an abstract class named Shape that contains two integers and an empty method named printArea(). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the classShape. Each one of the classes contain only the method printArea() that prints the area of the given shape.

```
import java.util.Scanner;
class InputScanner {
  Scanner s = new Scanner(System.in);
  int getInput(String prompt) {
     System.out.println(prompt);
     return s.nextInt();
  }
}
class shape extends InputScanner {
  double dim1;
  double dim2;
  shape(double a, double b) {
     dim1 = a;
     dim2 = b;
  }
}
class Rectangle extends shape {
  Rectangle() {
     super(0, 0);
     dim1 = getInput("Enter length");
     dim2 = getInput("Enter breadth");
  }
  double area() {
     System.out.println("Inside Area for Rectangle.");
     return dim1 * dim2;
```

```
}
}
class Triangle extends shape {
  Triangle() {
     super(0, 0);
     dim1 = getInput("Enter length");
     dim2 = getInput("Enter base");
  }
  double area() {
     System.out.println("Inside Area for Triangle.");
     return dim1 * dim2 / 2;
  }
class Circle extends shape {
  Circle() {
     super(0, 0);
     dim1 = getInput("Enter the radius");
     dim2 = dim1;
  }
  double area() {
     System.out.println("Inside Area for Circle.");
     return Math.PI * dim1 * dim2;
  }
}
public class Areas {
  public static void main(String[] args) {
     Rectangle rectangle = new Rectangle();
     System.out.println("Area of Rectangle: " + rectangle.area());
     Triangle triangle = new Triangle();
     System.out.println("Area of Triangle: " + triangle.area());
```

```
Circle circle = new Circle();
    System.out.println("Area of Circle: " + circle.area());
}
```

Develop a Java program to create a class Bank that maintains two kinds of account for its customers, one called savings account and the other current account. The savings account provides compound interest and withdrawal facilities but no cheque book facility. The current account provides cheque book facility but no interest. Current account holders should also maintain a minimum balance and if the balance falls below this level, a service charge is imposed. Create a class Account that stores customer name, account number and type of account. From this derive the classes Cur-acct and Sav-acct to make them more specific to their requirements. Include the necessary methods in order to achieve the following tasks:

- a) Accept deposit from customer and update the balance.
- b) Display the balance.
- c) Compute and deposit interest
- d) Permit withdrawal and update the balance

Check for the minimum balance, impose penalty if necessary and update the balance.

```
import java.util.Scanner;
class Account {
    String customerName;
    int accountNumber;
    String accountType;
    double balance;
    Account(String name, int number, String type, double initialBalance) {
        customerName = name;
        accountNumber = number;
        accountType = type;
        balance = initialBalance;
    }
    void deposit(double amount) {
        balance += amount;
        System.out.println("Deposit of INR " + amount + " successful");
}
```

```
}
  void displayBalance() {
     System.out.println("Account Number: " + accountNumber);
     System.out.println("Customer Name: " + customerName);
     System.out.println("Account Type: " + accountType);
     System.out.println("Balance: INR " + balance);
  }
  void withdraw(double amount) {
     if (balance >= amount) {
       balance -= amount;
       System.out.println("Withdrawal of INR " + amount + " successful");
     } else {
       System.out.println("Insufficient funds");
  }
  void computeInterest() {
  void checkMinimumBalance(double minBalance, double serviceCharge) {
  }
}
class SavAcct extends Account {
  double interestRate = 0.05;
  SavAcct(String name, int number, String type, double initialBalance) {
     super(name, number, type, initialBalance);
  }
  void computeInterest() {
     double interest = balance * interestRate;
    balance += interest;
    System.out.println("Interest of INR " + interest + " added to the account");
  }
```

```
}
class CurAcct extends Account {
  double minBalance = 1000;
  double serviceCharge = 50;
  CurAcct(String name, int number, String type, double initialBalance) {
     super(name, number, type, initialBalance);
  }
  void checkMinimumBalance(double minBalance, double serviceCharge) {
     if (balance < minBalance) {
       System.out.println("Service charge of INR " + serviceCharge + " imposed");
       balance -= serviceCharge;
     }
  }
public class Bank {
  public static void main(String[] args) {
     Scanner scanner = new Scanner(System.in);
     System.out.print("Enter the number of users: ");
     int numUsers = scanner.nextInt();
     Account[] accounts = new Account[numUsers];
     for (int i = 0; i < numUsers; i++) {
       System.out.println("\nUser" + (i + 1));
       System.out.print("Enter customer name: ");
       scanner.nextLine();
       String name = scanner.nextLine();
       System.out.print("Enter account number: ");
       int accNumber = scanner.nextInt();
       System.out.print("Enter initial deposit amount: INR ");
       double initialDeposit = scanner.nextDouble();
       System.out.print("Enter account type (Savings/Current): ");
       scanner.nextLine();
```

```
String accType = scanner.nextLine();
  if (accType.equalsIgnoreCase("Savings")) {
    accounts[i] = new SavAcct(name, accNumber, accType, initialDeposit);
  } else if (accType.equalsIgnoreCase("Current")) {
    accounts[i] = new CurAcct(name, accNumber, accType, initialDeposit);
  } else {
    System.out.println("Invalid account type entered. Defaulting to Account.");
    accounts[i] = new Account(name, accNumber, "Account", initialDeposit);
  }
}
boolean exit = false;
while (!exit) {
  System.out.println("\nChoose an option:");
  System.out.println("1. Deposit");
  System.out.println("2. Withdraw");
  System.out.println("3. Display Balance");
  System.out.println("4. Compute Interest (Savings only)");
  System.out.println("5. Exit");
  System.out.print("Enter your choice: ");
  int choice = scanner.nextInt();
  switch (choice) {
    case 1:
       System.out.print("Enter account number: ");
       int accNum = scanner.nextInt();
       System.out.print("Enter deposit amount: INR ");
       double depositAmount = scanner.nextDouble();
       for (Account acc : accounts) {
         if (acc.accountNumber == accNum) {
            acc.deposit(depositAmount);
          }
       }
```

```
break;
case 2:
  System.out.print("Enter account number: ");
  accNum = scanner.nextInt();
  System.out.print("Enter withdrawal amount: INR ");
  double withdrawAmount = scanner.nextDouble();
  for (Account acc : accounts) {
    if (acc.accountNumber == accNum) {
       acc.withdraw(withdrawAmount);
     }
  }
  break;
case 3:
  System.out.print("Enter account number: ");
  accNum = scanner.nextInt();
  for (Account acc : accounts) {
    if (acc.accountNumber == accNum) {
       acc.displayBalance();
     }
  }
  break;
case 4:
  System.out.print("Enter account number (for Savings account): ");
  accNum = scanner.nextInt();
  for (Account acc : accounts) {
    if (acc.accountNumber == accNum && acc instanceof SavAcct) {
       ((SavAcct) acc).computeInterest();
     }
  break;
case 5:
```

Create a package CIE which has two classes- Student and Internals. The class Personal has members like usn, name, sem. The class internals has an array that stores the internal marks scored in five courses of the current semester of the student. Create another package SEE which has the class External which is a derived class of Student. This class has an array that stores the SEE marks scored in five courses of the current semester of the student. Import the two packages in a file that declares the final marks of n students in all five courses.

```
package CIE;
public class Student {
  public String usn;
  public String name;
  public int sem;
  public Student(String usn, String name, int sem) {
     this.usn = usn:
     this.name = name:
     this.sem = sem;
  }
}
package CIE;
public class Internals extends Student {
  public int[] internalMarks;
  public Internals(String usn, String name, int sem, int[] internalMarks) {
     super(usn, name, sem);
    this.internalMarks = internalMarks;
  }
}
package SEE;
```

```
import CIE.Student;
public class External extends Student {
  public int[] seeMarks;
  public External(String usn, String name, int sem, int[] seeMarks) {
     super(usn, name, sem);
     this.seeMarks = seeMarks;
  }
}
import CIE.Internals;
import SEE.External;
import java.util.Scanner;
public class FinalMarks {
  public static void main(String[] args) {
     Scanner scanner = new Scanner(System.in);
     System.out.print("Enter the number of students: ");
     int n = scanner.nextInt();
     Internals[] cieStudents = new Internals[n];
     External[] seeStudents = new External[n];
     for (int i = 0; i < n; i++) {
       System.out.println("Enter details for CIE of student " + (i + 1));
       System.out.print("USN: ");
       String usn = scanner.next();
       System.out.print("Name: ");
       String name = scanner.next();
       System.out.print("Semester: ");
       int sem = scanner.nextInt();
       int[] cieMarks = new int[5];
       System.out.print("Enter CIE marks for 5 courses: ");
       for (int j = 0; j < 5; j++) {
```

```
cieMarks[j] = scanner.nextInt();
  cieStudents[i] = new Internals(usn, name, sem, cieMarks);
for (int i = 0; i < n; i++) {
  System.out.println("Enter details for SEE of student " + (i + 1));
  System.out.print("USN: ");
  String usn = scanner.next();
  System.out.print("Name: ");
  String name = scanner.next();
  System.out.print("Semester: ");
  int sem = scanner.nextInt();
  int[] seeMarks = new int[5];
  System.out.print("Enter SEE marks for 5 courses: ");
  for (int j = 0; j < 5; j++) {
     seeMarks[j] = scanner.nextInt();
  seeStudents[i] = new External(usn, name, sem, seeMarks);
System.out.println("\nFinal Marks of Students:");
for (int i = 0; i < n; i++) {
  System.out.println("\nDetails of Student " + (i + 1));
  System.out.println("USN: " + cieStudents[i].usn);
  System.out.println("Name: " + cieStudents[i].name);
  System.out.println("Semester: " + cieStudents[i].sem);
  System.out.println("CIE Marks: ");
  for (int j = 0; j < 5; j++) {
     System.out.print(cieStudents[i].internalMarks[j] + " ");
  System.out.println("\nSEE Marks: ");
```

```
for \ (int \ j=0; \ j<5; \ j++) \ \{ System.out.print(seeStudents[i].seeMarks[j]+""); \} \} \}
```

Write a program that demonstrates handling of exceptions in inheritance tree. Create a base class called "Father" and derived class called "Son" which extends the base class. In Father class, implement a constructor which takes the age and throws the exception WrongAge() when the input age<0. In Son class, implement a constructor that cases both father and son's age and throws an exception if son's age is >=father's age.

```
import java.util.Scanner;
class WrongAge extends Exception {
  public WrongAge(String message) {
     super(message);
  }
}
class Father {
  protected int fatherAge;
  public Father(int age) throws WrongAge {
     fatherAge = age;
    if (fatherAge < 0) {
       throw new WrongAge("Father's age cannot be negative");
     }
  }
class Son extends Father {
  private int sonAge;
  public Son(int fatherAge, int sonAge) throws WrongAge {
     super(fatherAge);
     this.sonAge = sonAge;
     if (sonAge \ll 0) {
       throw new WrongAge("Son's age cannot be negative or zero");
     }
     if (sonAge >= fatherAge) {
```

```
throw new WrongAge("Son's age cannot be greater than or equal to father's age");
      }
   }
}
public class Main {
   public static void main(String[] args) {
      Scanner scanner = new Scanner(System.in);
     try {
        System.out.print("Enter father's age: ");
        int fatherAge = scanner.nextInt();
        System.out.print("Enter son's age: ");
        int sonAge = scanner.nextInt();
        Son son = new Son(fatherAge, sonAge);
        System.out.println("Father's age: " + fatherAge);
        System.out.println("Son's age: " + sonAge);
      } catch (WrongAge e) {
        System.out.println("Exception caught: " + e);
        System.out.println("Exception caught: " + e.getMessage());
      } catch (Exception e) {
        System.out.println("Error: " + e);
        System.out.println("Error: " + e.getMessage());
      } finally {
        scanner.close();
   }
}
```

Write a program which creates two threads, one thread displaying "BMS College of Engineering" once every ten seconds and another displaying "CSE" once every two seconds.

```
class DisplayThread extends Thread {
  private String message;
  private int interval;
  private boolean running = true;
  public DisplayThread(String message, int interval) {
     this.message = message;
     this.interval = interval;
  public void run() {
     while (running) {
       System.out.println(message);
       try {
          Thread.sleep(interval);
       } catch (InterruptedException e) {
          e.printStackTrace();
       }
  public void stopThread() {
     running = false;
  }
}
public class ThreadEx {
  public static void main(String[] args) {
     DisplayThread bmsThread = new DisplayThread("BMS College of Engineering", 10000);
     DisplayThread cseThread = new DisplayThread("CSE", 2000);
```

```
bmsThread.start();
  cseThread.start();
  System.out.println("Press Enter to stop the threads...");
  try {
     System.in.read();
  } catch (Exception e) {
     e.printStackTrace();
  }
  bmsThread.stopThread();
  cseThread.stopThread();
}
```

Write a program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a NumberFormatException. If Num2 were Zero, the program would throw an Arithmetic Exception Display the exception in a message dialog box.

```
import javax.swing.*;
import java.awt.*;
import java.awt.event.*;
class SwingDemo{
SwingDemo(){
JFrame jfrm = new JFrame("Divider App");
jfrm.setSize(275, 150);
jfrm.setLayout(new FlowLayout());
jfrm.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
JLabel jlab = new JLabel("Enter the divider and divident:");
JTextField aitf = new JTextField(8);
JTextField bjtf = new JTextField(8);
JButton button = new JButton("Calculate");
JLabel err = new JLabel();
JLabel alab = new JLabel();
JLabel blab = new JLabel();
JLabel anslab = new JLabel();
jfrm.add(err); // to display error bois
jfrm.add(jlab);
jfrm.add(ajtf);
jfrm.add(bjtf);
jfrm.add(button);
```

```
jfrm.add(alab);
jfrm.add(blab);
ifrm.add(anslab);
ActionListener l = new ActionListener() {
public void actionPerformed(ActionEvent evt) {
System.out.println("Action event from a text field");
}
};
ajtf.addActionListener(l);
bjtf.addActionListener(l);
button.addActionListener(new ActionListener() {
public void actionPerformed(ActionEvent evt) {
try{
int a = Integer.parseInt(ajtf.getText());
int b = Integer.parseInt(bjtf.getText());
int ans = a/b;
alab.setText("\nA = " + a);
blab.setText("\nB = " + b);
anslab.setText("\nAns = "+ ans);
}
catch(NumberFormatException e){
alab.setText("");
blab.setText("");
anslab.setText("");
err.setText("Enter Only Integers!");
}
catch(ArithmeticException e){
alab.setText("");
blab.setText("");
anslab.setText("");
err.setText("B should be NON zero!");
```

```
}
}
});
jfrm.setVisible(true);
}
public static void main(String args[]){
SwingUtilities.invokeLater(new Runnable(){
public void run(){
new SwingDemo();
}
});
}
```

Demonstrate Inter process Communication and deadlock.

IPC

```
class Q {
int n;
boolean valueSet = false;
synchronized int get() {
while(!valueSet)
try {
wait();
} catch(InterruptedException e) {
System.out.println("InterruptedException caught");
}
System.out.println("Got: " + n);
valueSet = false;
notify();
return n;
}
synchronized void put(int n) {
while(valueSet)
try {
wait();
} catch(InterruptedException e) {
System.out.println("InterruptedException caught");
}
this.n = n;
valueSet = true;
System.out.println("Put: " + n);
notify();
```

```
}
}
class Producer implements Runnable {
Qq;
Producer(Q q) {
this.q = q;
new Thread(this, "Producer").start();
public void run() {
int i = 0;
while (i \!\!<\!\! 15) \; \{
q.put(i++);
}
}
class Consumer implements Runnable {
Qq;
Consumer(Q q) {
this.q = q;
new Thread(this, "Consumer").start();
}
public void run() {
int i=0;
while(i<15) {
int r=q.get();
i++;
}
class PCFixed {
public static void main(String args[]) {
```

```
Q q = new Q();
new Producer(q);
new Consumer(q);
System.out.println("Press Control-C to stop.");
}
```

Deadlock

```
class A {
synchronized void foo(B b) {
String name = Thread.currentThread().getName();
System.out.println(name + " entered A.foo");
try {
Thread.sleep(1000);
} catch(Exception e) {
System.out.println("A Interrupted");
}
System.out.println(name + " trying to call B.last()");
b.last();
}
void last() {
System.out.println("Inside A.last");
}
}
class B {
synchronized void bar(A a) {
String name = Thread.currentThread().getName();
System.out.println(name + " entered B.bar");
try {
Thread.sleep(1000);
} catch(Exception e) {
System.out.println("B Interrupted");
}
System.out.println(name + " trying to call A.last()");
a.last();
}
void last() {
```

```
System.out.println("Inside A.last");
}
}
class Deadlock implements Runnable
A a = new A();
B b = new B();
Deadlock() {
Thread.currentThread().setName("MainThread");
Thread t = new Thread(this, "RacingThread");
t.start();
a.foo(b);
System.out.println("Back in mainthread");
public void run() {
b.bar(a);
System.out.println("Back in other thread");
}
public static void main(String args[]) {
new Deadlock();
}
}
```