Graphic Era
HILL UNIVERSITY
Established by an Act of the State Legislature of Uttarakhand (Adhiniyam Sankhya 12 of 2011)

Term Work

On

Java Programming Language

(PCS 408)

Submitted to:

Dr. Prateek Srivastava
Associate Professor
GEHU, D. Dun

Submitted by:

Vaibhav Kumar Kapriyal
University Roll. No.: 2018837
Class Roll No./Section: 60/A

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

GRAPHIC ERA HILL UNIVERSITY, DEHRADUN

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DEPARTMENT OF CSE
STUDENT LAB REPORT SHEET

Photograph
Passport Size

Name of Student :- Vaibhav Kumar Kapriyal Mob. No :- 9411354282

Address Permanent :- Luxmi Narayan Puram Near Vaishnav Vihar Raipur Road D.Dun

Father's Name :- Jitendra Kumar Occupation :- Govt Job Mob. No :- 9259207191

Mother's Name :- Meena Occupation :- Homemaker Mob. No :- 9897100858

Section :- A Branch :- CSE Semester :- IV Class Roll No :- 60 Grade A B C

Local Address:- Same as Permanent Email :-vaibhav17jul@gmail.com Marks 5 3 1

S.No.	Practical	D.O.P.	Date of Submission	Grade (Viva)	Grade (Report File)	Total Marks (out of 10)	Student's Signature	Teacher's Signature
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								

PRACTICAL 1

Question 1: Create a class "Student" having following instance variables and methods.

Instance variables: ID, Name, Branch and university

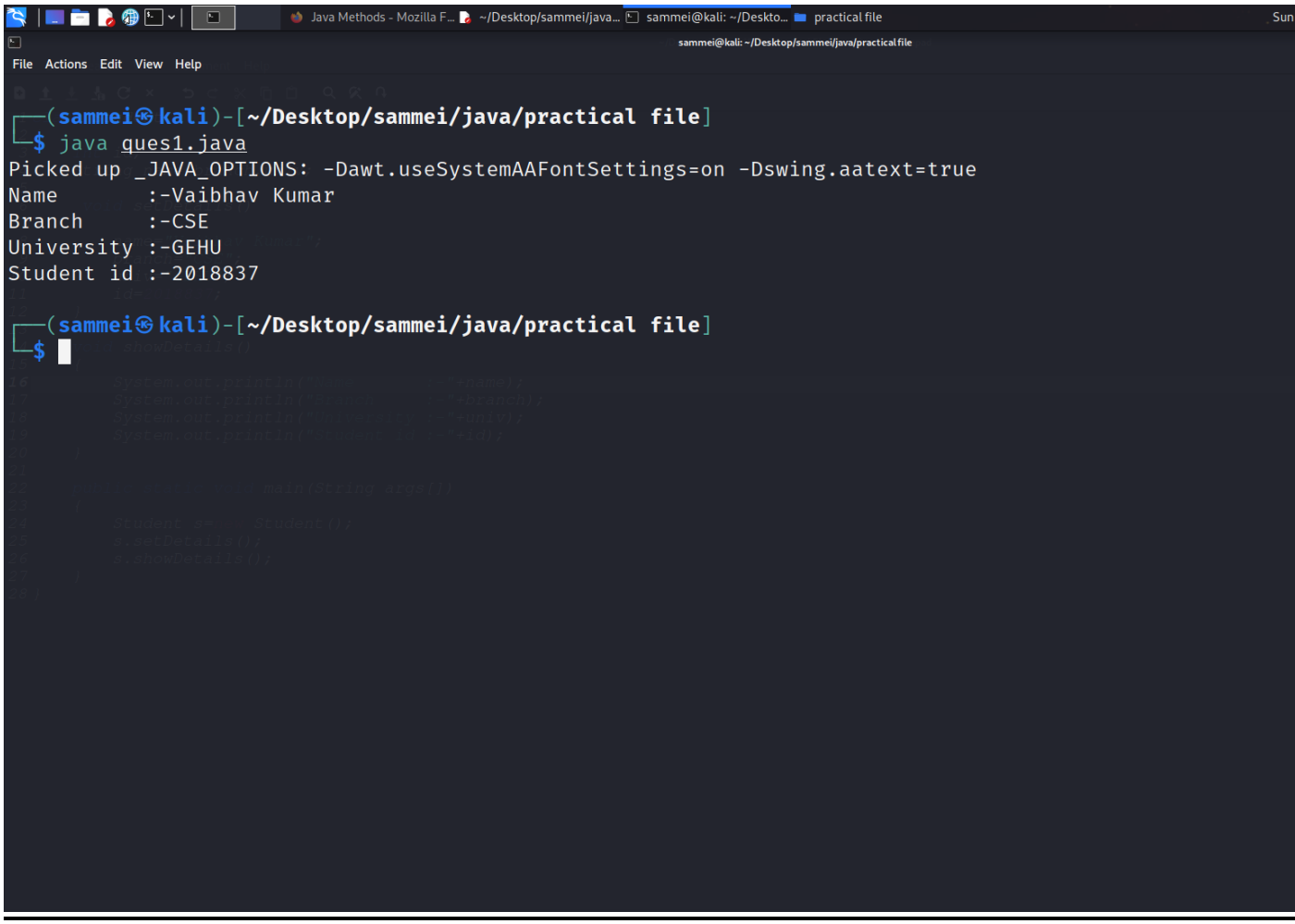
Method: setDetails() and showDetails().

The setDetails() method sets the values of ID, Name, Branch and University. And showDetails() method shows the value of each field.

Source Code:

```
class
Student
          {
                 int id;
                 String name,branch,univ;

                  void setDetails()
                 {
                        name="Vaibhav Kumar";
                        branch="CSE";
                        univ="GEHU";
                        id=2018837;
                 }

                 void showDetails()
                 {
                        System.out.println("Name       :-"+name);
                        System.out.println("Branch     :-"+branch);
                        System.out.println("University :-"+univ);
                        System.out.println("Student id :-"+id);
                 }

                 public static void main(String args[])
                 {
                        Student s=new Student();
                        s.setDetails();
                        s.showDetails();
                 }
          }
```

Output:


Java Methods - Mozilla F...
~/Desktop/sammei/java...
sammei@kali: ~/Deskto...
practical file
sammei@kali: ~/Desktop/sammei/java/practical file
File Actions Edit View Help
(sammei㉿kali)-[~/Desktop/sammei/java/practical file]
$ java ques1.java
Picked up _JAVA_OPTIONS: -Dawt.useSystemAAFontSettings=on -Dswing.aatext=true
Name :-Vaibhav Kumar
Branch :-CSE
University :-GEHU
Student id :-2018837
(sammei㉿kali)-[~/Desktop/sammei/java/practical file]
$

Question 2: Write a Java Program to demonstrate the working of a banking-system

Instance variables: name, account_no, amount.

Instance methods: deposit(), withdraw(), checkBalance(), insert() and display().

Here we can deposit and withdraw amount from our account using deposit() and withdraw() methods respectively.

The insert() method is to initialize state and display() method is to display state values.

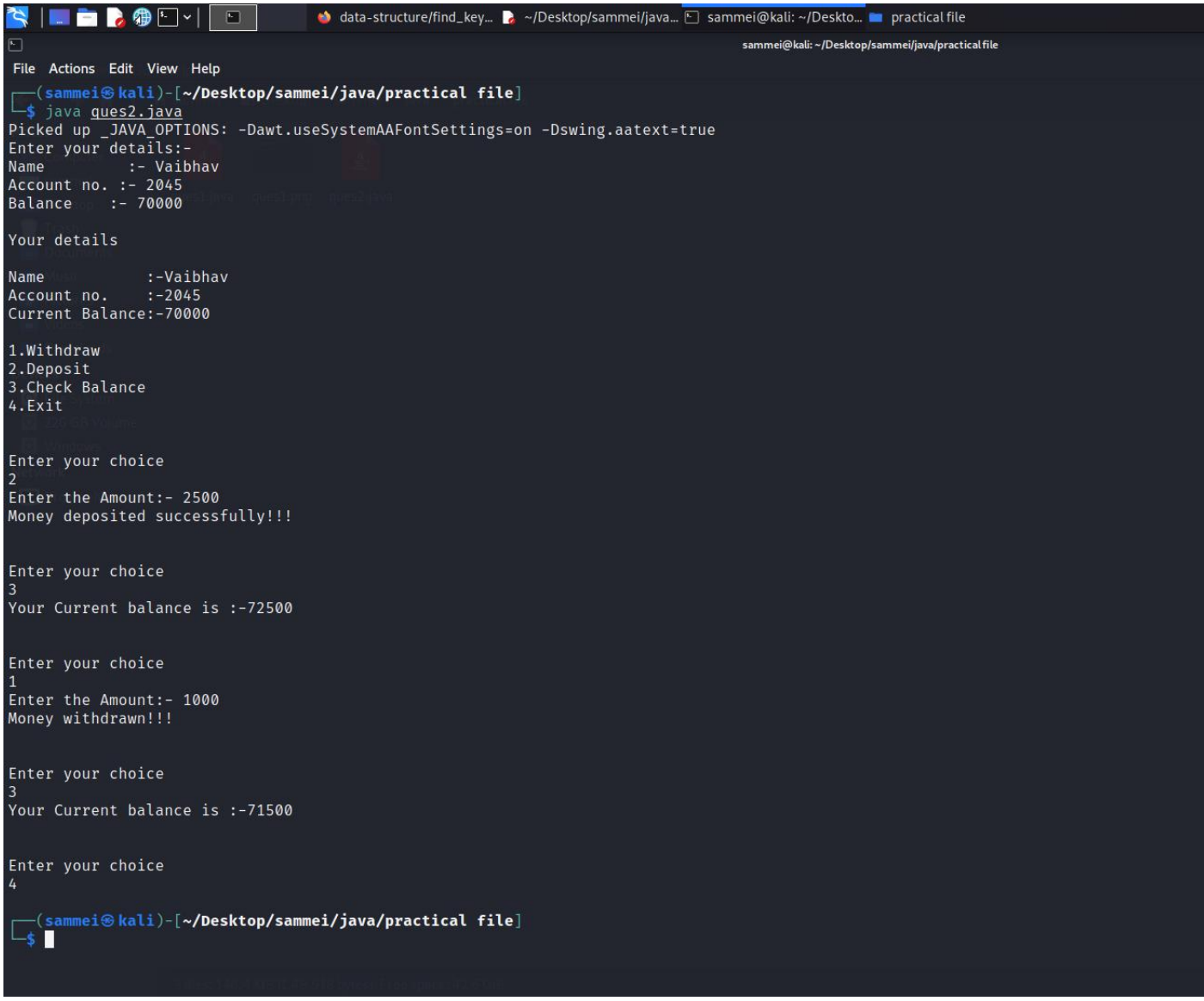
Source Code:

```
import
java.util.*;

                class Bank
                {
                        int accno,bal;
                        String name;

                        Scanner sc=new Scanner(System.in);

                        void insert()
                        {
                                System.out.println("Enter your details:- ");
                                System.out.print("Name         :- ");
                                name=sc.nextLine();
                                System.out.print("Account no. :- ");
                                accno=sc.nextInt();
                                System.out.print("Balance    :- ");
                                bal=sc.nextInt();
                        }
                        void withdraw()
                        {
                                int w;
                                if(bal>0)
                                {
                                        System.out.print("Enter the Amount:- ");
                                        w=sc.nextInt();
                                        if(w>bal)
                                                System.out.println("Cannot withdraw the
ammount");
                                        else
                                        {
```

```
                        System.out.println("Money withdrawn!!!");
                        bal=bal-w;
                }
        }
}
void deposit()
{
        int d;
        System.out.print("Enter the Amount:- ");
        d=sc.nextInt();
        System.out.println("Money deposited successfully!!!");
        bal=bal+d;
}
void checkBalance()
{
        System.out.println("Your Current balance is :-"+bal);
}
void display()
{
        System.out.println("Your details");
        System.out.println();
        System.out.println("Name           :-"+name);
        System.out.println("Account no.    :-"+accno);
        System.out.println("Current Balance:-"+bal);
}

public static void main(String args[])
{
        Bank b=new Bank();
        b.insert();
        System.out.println();
        b.display();
        System.out.println();
        Scanner sc=new Scanner(System.in);
        System.out.println("1.Withdraw");
        System.out.println("2.Deposit");
        System.out.println("3.Check Balance");
        System.out.println("4.Exit");
        System.out.println();
        int ch=0;
        while(ch!=4)
        {
                System.out.println();
                System.out.println("Enter your choice");
                ch=sc.nextInt();
```

```
                        switch(ch)
                        {
                                case 1:
                                {
                                        b.withdraw();
                                        System.out.println();
                                        break;
                                }
                                case 2:
                                {
                                        b.deposit();
                                        System.out.println();
                                        break;
                                }
                                case 3:
                                {
                                        b.checkBalance();
                                        System.out.println();
                                        break;
                                }
                        }
                }

        }

}
```

Output:


data-structure/find_key...
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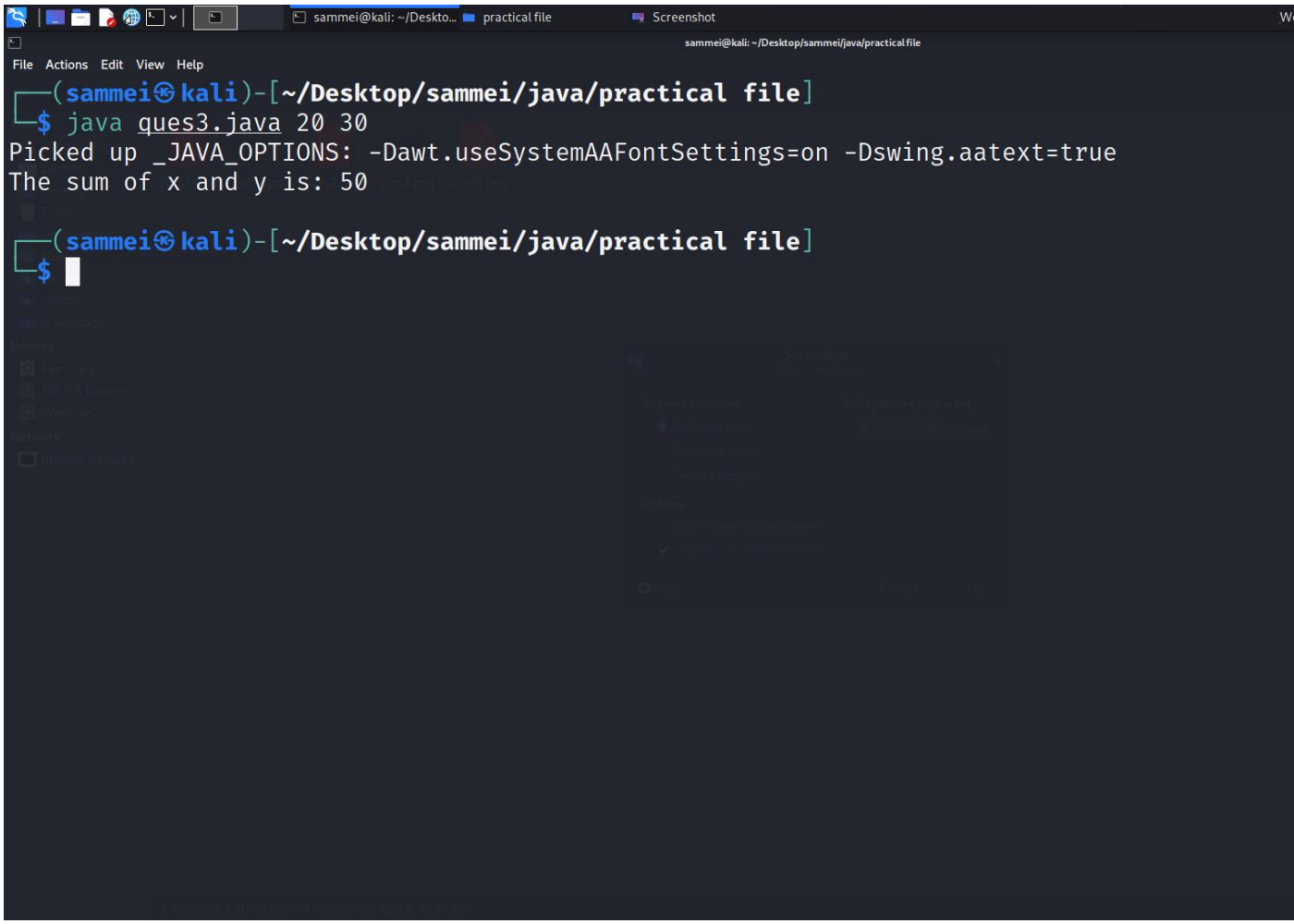
sammei@kali: ~/Deskto...
practical file
sammei@kali: ~/Desktop/sammei/java/practical file
File Actions Edit View Help
(sammei㉿kali)-[~/Desktop/sammei/java/practical file]
$ java ques2.java
Picked up _JAVA_OPTIONS: -Dawt.useSystemAAFontSettings=on -Dswing.aatext=true
Enter your details:-
Name :- Vaibhav
Account no. :- 2045
Balance :- 70000
Your details
Name :-Vaibhav
Account no. :-2045
Current Balance:-70000
1.Withdraw
2.Deposit
3.Check Balance
4.Exit
Enter your choice
2
Enter the Amount:- 2500
Money deposited successfully!!!
Enter your choice
3
Your Current balance is :-72500
Enter your choice
1
Enter the Amount:- 1000
Money withdrawn!!!
Enter your choice
3
Your Current balance is :-71500
Enter your choice
4
(sammei㉿kali)-[~/Desktop/sammei/java/practical file]
$

Question 3: Write a program to sum two numbers. Here inputs are provided through command line argument.

Source Code:

```
public class
SumOfNumbers4
                    {
                    public static void main(String args[])
                    {
                    int x = Integer.parseInt(args[0]); //first arguments
                    int y = Integer.parseInt(args[1]); //second arguments
                    int sum = x + y;
                    System.out.println("The sum of x and y is: " +sum);
                    }
                    }
```

Output:


sammei@kali: ~/Deskto...
practical file
Screenshot
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File Actions Edit View Help
(sammei㉿kali)-[~/Desktop/sammei/java/practical file]
$ java ques3.java 20 30
Picked up _JAVA_OPTIONS: -Dawt.useSystemAAFontSettings=on -Dswing.aatext=true
The sum of x and y is: 50
(sammei㉿kali)-[~/Desktop/sammei/java/practical file]
$

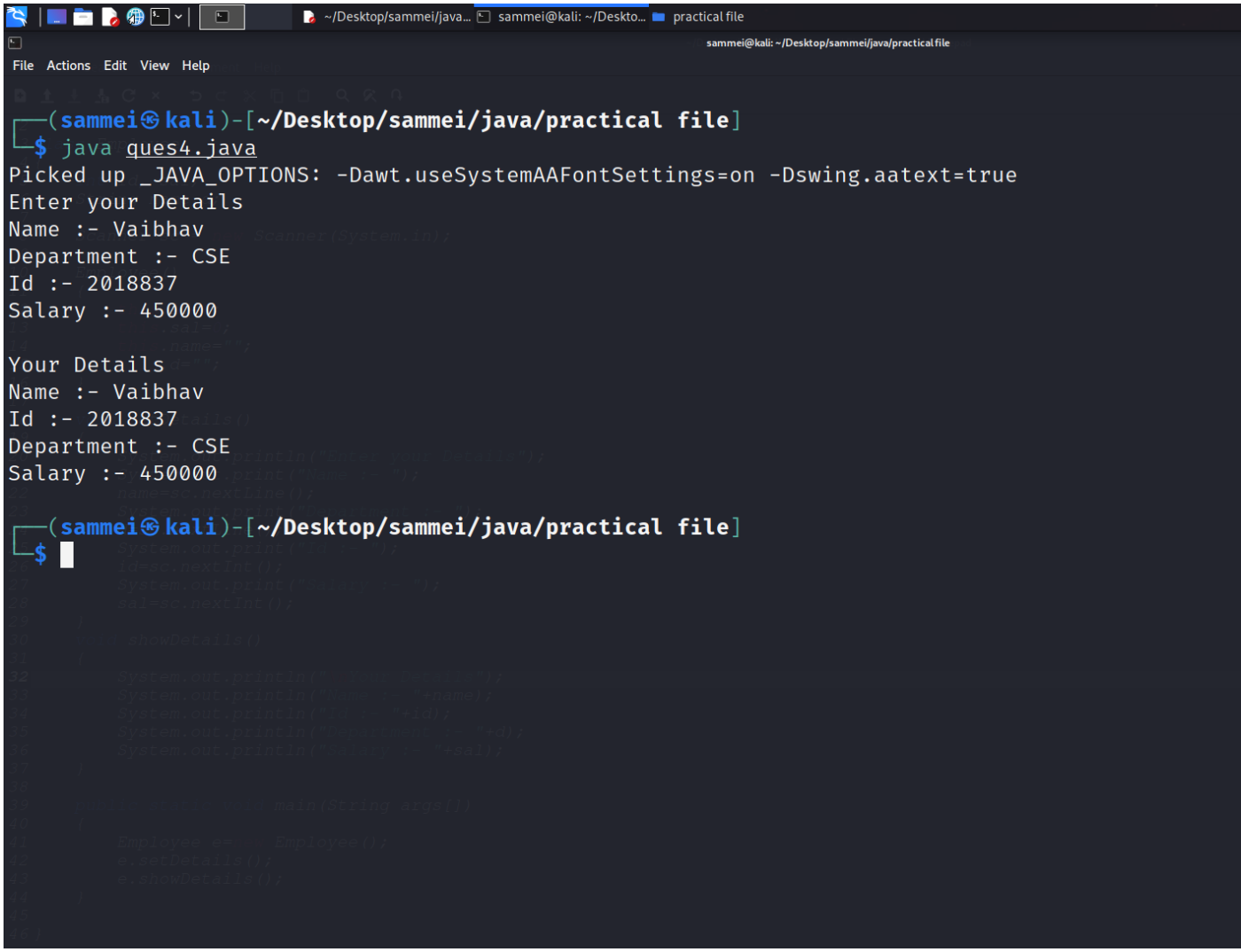
Question 4: Create class Employee with following attributes and methods ID, name, department and salary.
The setDetails() method sets the values of ID, name, department and salary. And showDetails() method shows the value of each field.
Note: (i) Values must be entered through Scanner class.
(ii) Use proper constructor
(iii) Use "this" reference variable to avoid ambiguity.

Source Code:

```
import
java.util.*;

                class Employee
                {
                        int id, sal;
                        String name,d;

                        Scanner sc = new Scanner(System.in);

                        Employee()
                        {
                                this.id=0;
                                this.sal=0;
                                this.name="";
                                this.d="";
                        }

                        void setDetails()
                        {
                                System.out.println("Enter your Details");
                                System.out.print("Name :- ");
                                name=sc.nextLine();
                                System.out.print("Department :- ");
                                d=sc.nextLine();
                                System.out.print("Id :- ");
                                id=sc.nextInt();
                                System.out.print("Salary :- ");
                                sal=sc.nextInt();
                        }
                        void showDetails()
                        {
                                System.out.println("\nYour Details");
```

```
                System.out.println("Name :- "+name);
                System.out.println("Id :- "+id);
                System.out.println("Department :- "+d);
                System.out.println("Salary :- "+sal);
        }

        public static void main(String args[])
        {
                Employee e=new Employee();
                e.setDetails();
                e.showDetails();
        }

}
```

Output:

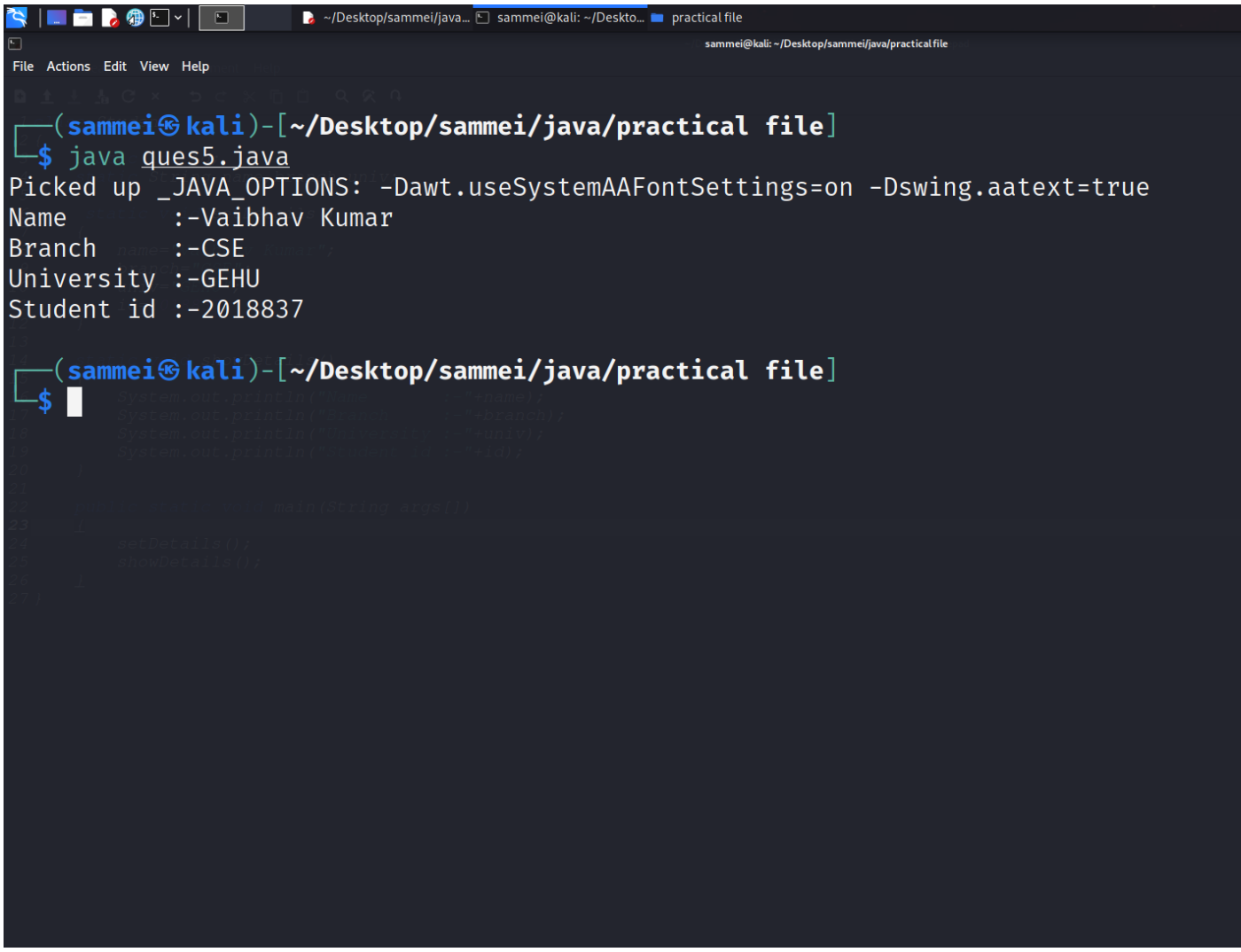

~/Desktop/sammei/java...
sammei@kali: ~/Deskto...
practical file
sammei@kali: ~/Desktop/sammei/java/practical file
File Actions Edit View Help
┌──(sammei㉿kali)-[~/Desktop/sammei/java/practical file]
└─$ java ques4.java
Picked up _JAVA_OPTIONS: -Dawt.useSystemAAFontSettings=on -Dswing.aatext=true
Enter your Details
Name :- Vaibhav
Department :- CSE
Id :- 2018837
Salary :- 450000
Your Details
Name :- Vaibhav
Id :- 2018837
Department :- CSE
Salary :- 450000
┌──(sammei㉿kali)-[~/Desktop/sammei/java/practical file]
└─$

Question 5: Re-write program 1 with better memory management approach.
Note: use of static keyword

Source Code:

```
class
Student
          {
                 static int id;
                 static String name,branch,univ;

                  static void setDetails()
                 {
                        name="Vaibhav Kumar";
                        branch="CSE";
                        univ="GEHU";
                        id=2018837;
                 }

                 static void showDetails()
                 {
                        System.out.println("Name       :-"+name);
                        System.out.println("Branch     :-"+branch);
                        System.out.println("University :-"+univ);
                        System.out.println("Student id :-"+id);
                 }

                 public static void main(String args[])
                 {
                        setDetails();
                        showDetails();
                 }
          }
```

Output:

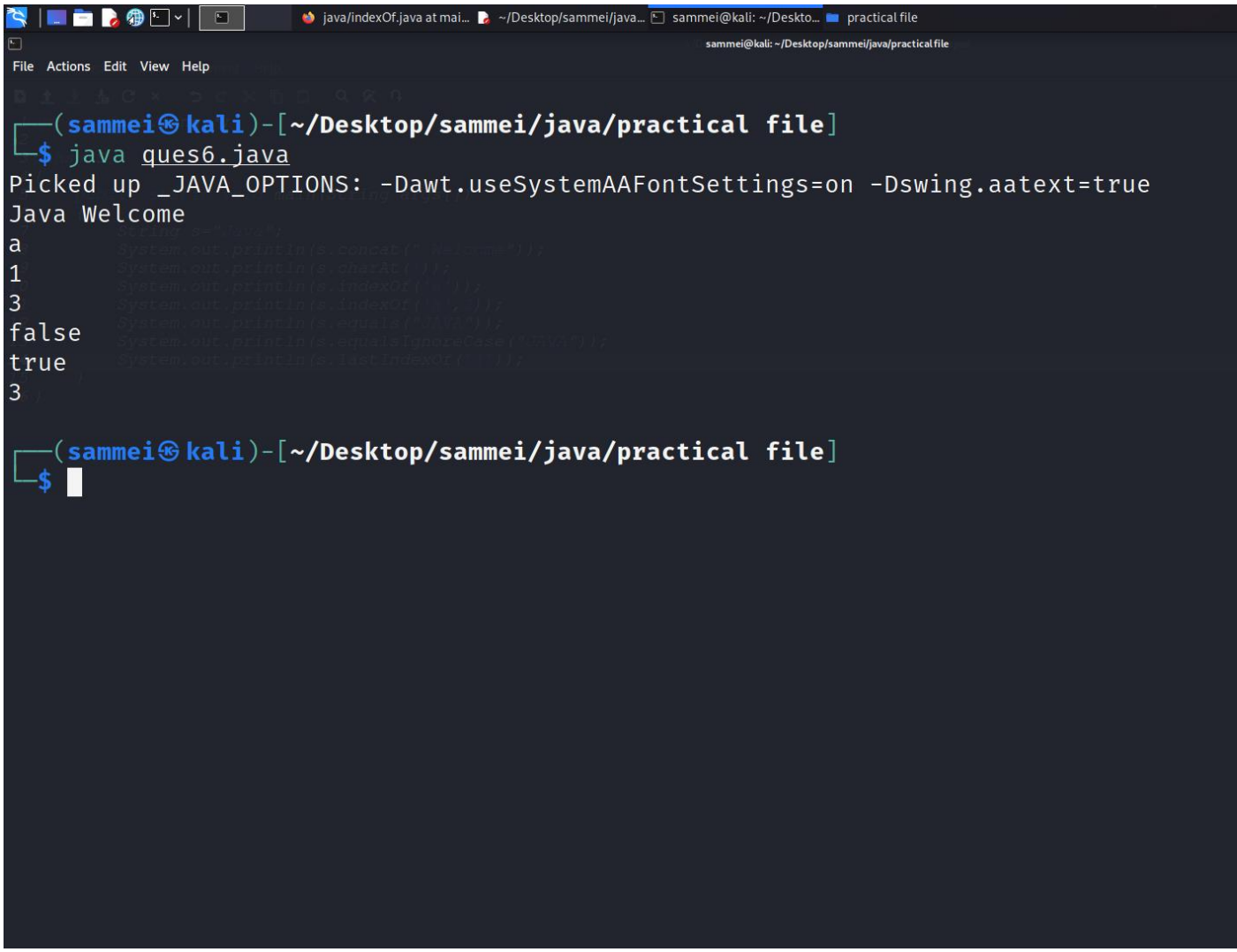

~/Desktop/sammei/java...
sammei@kali: ~/Deskto...
practical file
sammei@kali: ~/Desktop/sammei/java/practical file
File Actions Edit View Help
(sammei㉿kali)-[~/Desktop/sammei/java/practical file]
$ java ques5.java
Picked up _JAVA_OPTIONS: -Dawt.useSystemAAFontSettings=on -Dswing.aatext=true
Name :-Vaibhav Kumar
Branch :-CSE
University :-GEHU
Student id :-2018837
(sammei㉿kali)-[~/Desktop/sammei/java/practical file]
$

Question 6: Apply following functions on the String "Java".
(i) Try to concat "Welcome" and write down your observation.
(ii) Find character at index 1
(iii) Find index of first 'a'.
(iv) Find index of second 'a'
(v) Compare "Java" to "JAVA"
(vi) Compare "Java" to "JAVA" ignoring the case
(vii) Find the index of first 'a' from last

Source Code:

```
import
java.lang.*;

class S
{
	public static void main(String args[])
	{
		String s="Java";
		System.out.println(s.concat(" Welcome"));
		System.out.println(s.charAt(1));
		System.out.println(s.indexOf('a'));
		System.out.println(s.indexOf('a',2));
		System.out.println(s.equals("JAVA"));
		System.out.println(s.equalsIgnoreCase("JAVA"));
		System.out.println(s.lastIndexOf('a'));
	}
}
```

Output:

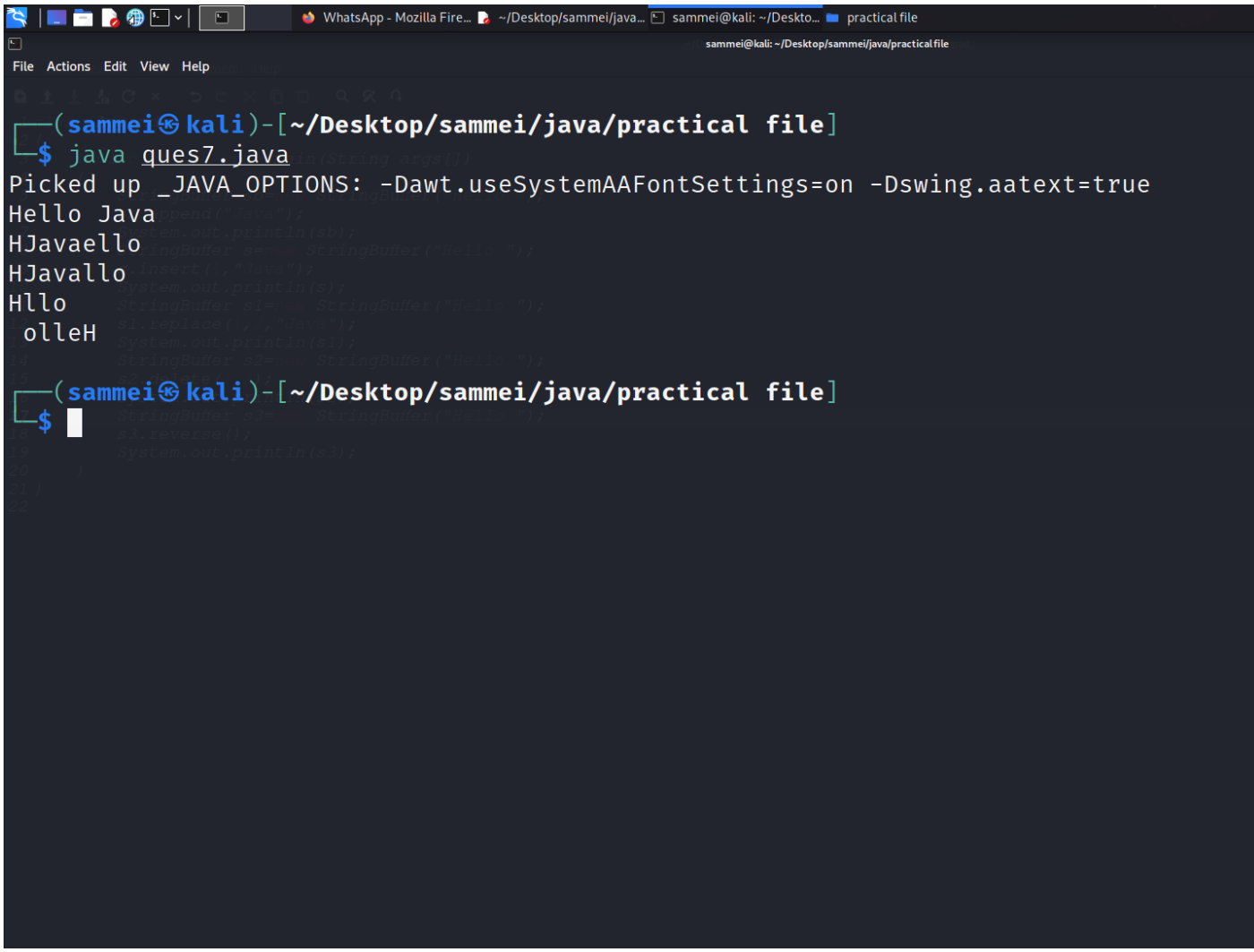

java/indexOf.java at mai...
~/Desktop/sammei/java...
sammei@kali: ~/Deskto...
practical file
sammei@kali: ~/Desktop/sammei/java/practical file
File Actions Edit View Help
(sammei㉿kali)-[~/Desktop/sammei/java/practical file]
$ java ques6.java
Picked up _JAVA_OPTIONS: -Dawt.useSystemAAFontSettings=on -Dswing.aatext=true
Java Welcome
a
1
3
false
true
3
(sammei㉿kali)-[~/Desktop/sammei/java/practical file]
$

Question 7: Apply following functions on StringBuffer object "HELLO"
(i) Append "Java"
(ii) Insert "Java" at index 1
(iii) Replace with "Java" with characters between index 1 to 2
(iv) Delete characters between index 1 and 2
(v) Reverse the string "HELLO"

Source Code:

```
class
Append
        {
                public static void main(String args[])
                {
                        StringBuffer sb=new StringBuffer("Hello ");
                        sb.append("Java");
                        System.out.println(sb);
                        StringBuffer s=new StringBuffer("Hello ");
                        s.insert(1,"Java");
                        System.out.println(s);
                        StringBuffer s1=new StringBuffer("Hello ");
                        s1.replace(1,2,"Java");
                        System.out.println(s1);
                        StringBuffer s2=new StringBuffer("Hello ");
                        s2.delete(1,2);
                        System.out.println(s2);
                        StringBuffer s3=new StringBuffer("Hello ");
                        s3.reverse();
                        System.out.println(s3);
                }
        }
```

Output:


WhatsApp - Mozilla Fire...
~/Desktop/sammei/java...
sammei@kali: ~/Deskto...
practical file
sammei@kali: ~/Desktop/sammei/java/practical file
File Actions Edit View Help
(sammei㉿kali)-[~/Desktop/sammei/java/practical file]
$ java ques7.java
Picked up _JAVA_OPTIONS: -Dawt.useSystemAAFontSettings=on -Dswing.aatext=true
Hello Java
HJavaello
HJavallo
Hllo
olleH
(sammei㉿kali)-[~/Desktop/sammei/java/practical file]
$

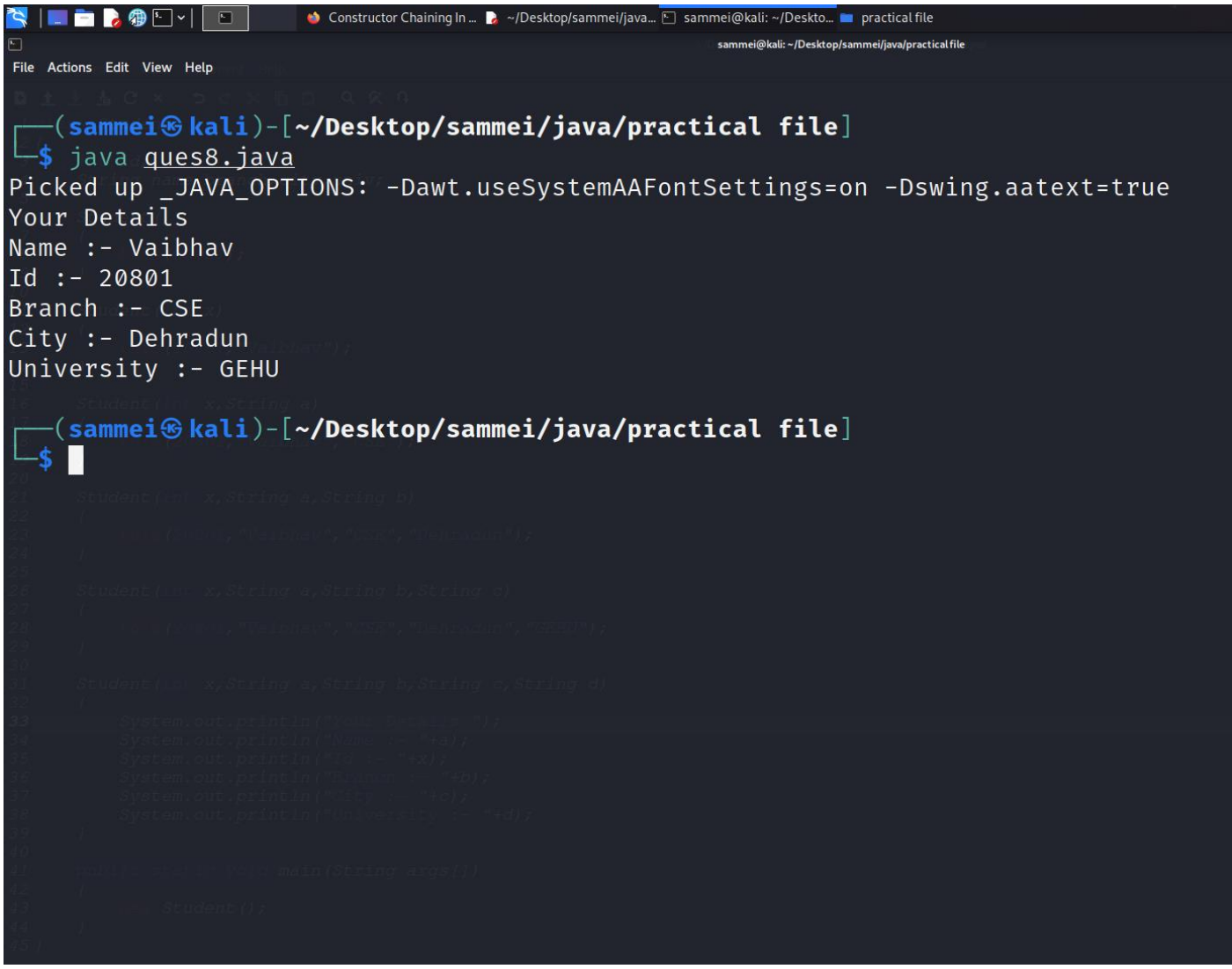
Question 8: Create a class “Student” having following instance variables and methods.
Instance variables: ID, Name, Branch, city and university
While creating constructors with one, two, three, four and five arguments reuse the constructors by **construction chaining**

Source Code:

```
class
Student
          {
                  int id;
                  String name,branch,city,univ;

                  Student()
                  {
                         this(20801);
                  }

                  Student(int x)
                  {
                         this(20801,"Vaibhav");
                  }

                  Student(int x,String a)
                  {
                         this(20801,"Vaibhav","CSE");
                  }

                  Student(int x,String a,String b)
                  {
                         this(20801,"Vaibhav","CSE","Dehradun");
                  }

                  Student(int x,String a,String b,String c)
                  {
                         this(20801,"Vaibhav","CSE","Dehradun","GEHU");
                  }

                  Student(int x,String a,String b,String c,String d)
                  {
                         System.out.println("Your Details ");
                         System.out.println("Name :- "+a);
                         System.out.println("Id :- "+x);
```

```
                System.out.println("Branch :- "+b);
                System.out.println("City :- "+c);
                System.out.println("University :- "+d);
        }

        public static void main(String args[])
        {
                new Student();
        }
}
```

Output:


Constructor Chaining In ...
~/Desktop/sammei/java...
sammei@kali: ~/Deskto...
practical file
sammei@kali: ~/Desktop/sammei/java/practical file
File Actions Edit View Help
(sammei㉿kali)-[~/Desktop/sammei/java/practical file]
$ java ques8.java
Picked up _JAVA_OPTIONS: -Dawt.useSystemAAFontSettings=on -Dswing.aatext=true
Your Details
Name :- Vaibhav
Id :- 20801
Branch :- CSE
City :- Dehradun
University :- GEHU
(sammei㉿kali)-[~/Desktop/sammei/java/practical file]
$

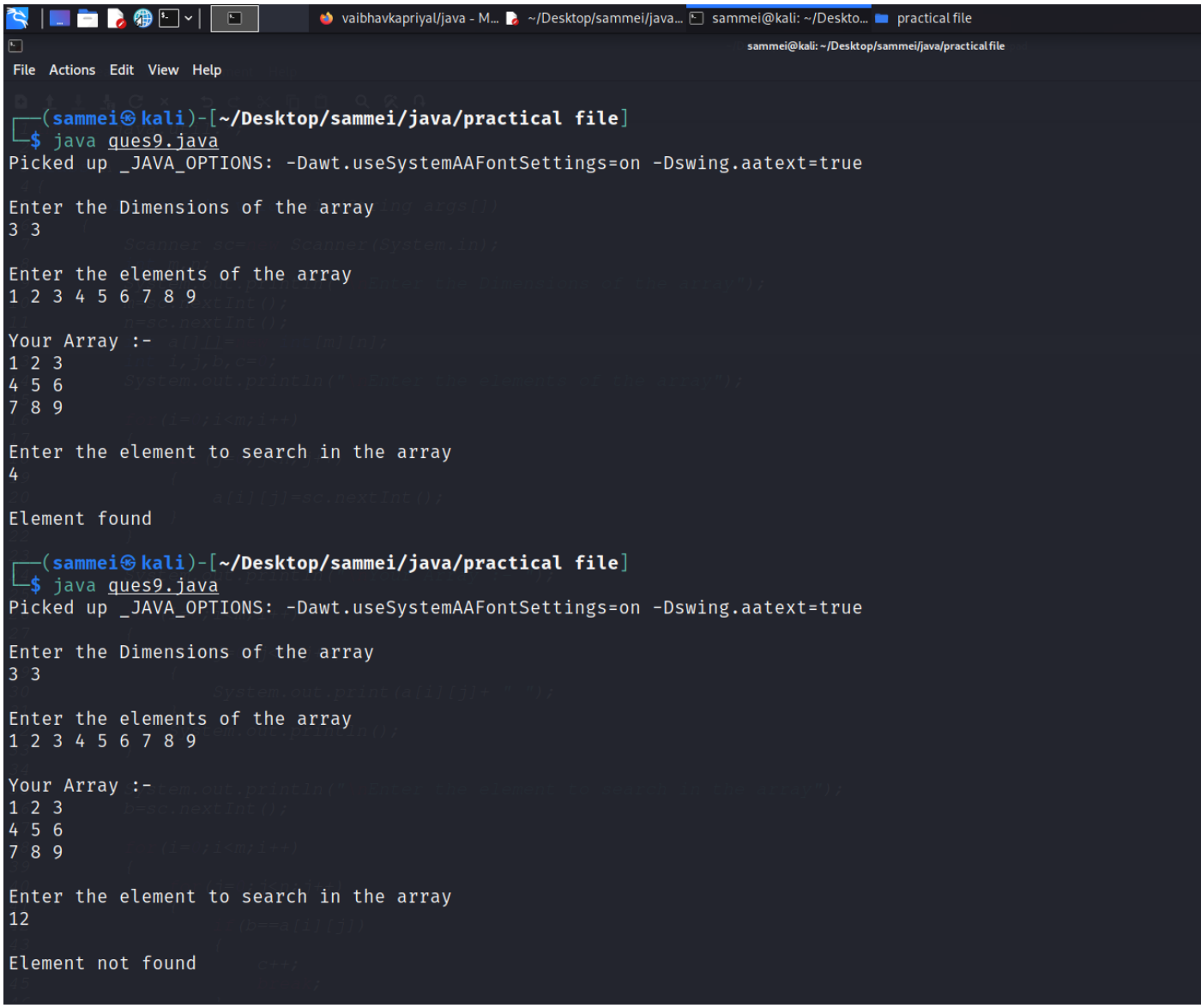
Question 9: Create two-dimensional integer array and insert, search and traverse this array.
Note: Use Scanner class to insert data.

Source Code:

```
import
java.util.*;

		class A
		{
			public static void main(String args[])
			{
				Scanner sc=new Scanner(System.in);
				int m,n;
				System.out.println("\nEnter the Dimensions of the array");
				m=sc.nextInt();
				n=sc.nextInt();
				int a[][]=new int[m][n];
				int i,j,b,c=0;
				System.out.println("\nEnter the elements of the array");

				for(i=0;i<m;i++)
				{
					for(j=0;j<n;j++)
					{
						a[i][j]=sc.nextInt();
					}
				}

				System.out.println("\nYour Array :- ");

				for(i=0;i<m;i++)
				{
					for(j=0;j<n;j++)
					{
						System.out.print(a[i][j]+ " ");
					}
					System.out.println();
				}

				System.out.println("\nEnter the element to search in the
		array");
```

```
                b=sc.nextInt();

                for(i=0;i<m;i++)
                {
                        for(j=0;j<n;j++)
                        {
                                if(b==a[i][j])
                                {
                                        c++;
                                        break;
                                }
                        }
                }

                if(c!=0)
                        System.out.println("\nElement found");
                else
                System.out.println("\nElement not found");
        }
}
```

Output:

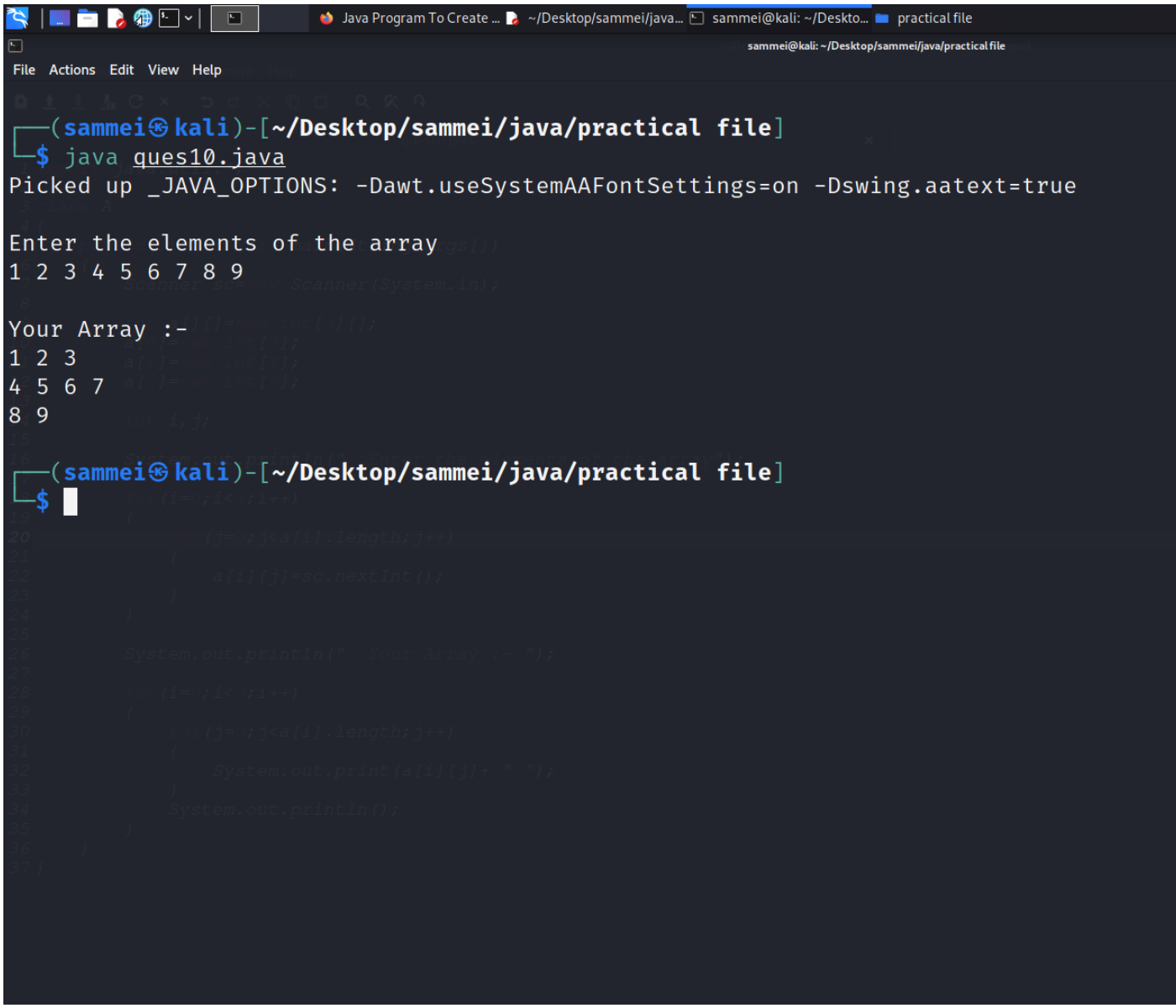

vaibhavkapriyal/java - M...
~/Desktop/sammei/java...
sammei@kali: ~/Deskto...
practical file
sammei@kali: ~/Desktop/sammei/java/practical file
File Actions Edit View Help
(sammei㉿kali)-[~/Desktop/sammei/java/practical file]
$ java ques9.java
Picked up _JAVA_OPTIONS: -Dawt.useSystemAAFontSettings=on -Dswing.aatext=true
Enter the Dimensions of the array
3 3
Enter the elements of the array
1 2 3 4 5 6 7 8 9
Your Array :-
1 2 3
4 5 6
7 8 9
Enter the element to search in the array
4
Element found
(sammei㉿kali)-[~/Desktop/sammei/java/practical file]
$ java ques9.java
Picked up _JAVA_OPTIONS: -Dawt.useSystemAAFontSettings=on -Dswing.aatext=true
Enter the Dimensions of the array
3 3
Enter the elements of the array
1 2 3 4 5 6 7 8 9
Your Array :-
1 2 3
4 5 6
7 8 9
Enter the element to search in the array
12
Element not found

Question 10: Create a jagged array having three rows. Where 1st row contains 3 columns, 2nd row contains 4 columns and 3rd row contains 2 columns. Insert and traverse it.

Source Code:

```
import
java.util.*;

class A
{
	public static void main(String args[])
	{
		Scanner sc=new Scanner(System.in);

		int a[][]=new int[3][];
		a[0]=new int[3];
		a[1]=new int[4];
		a[2]=new int[2];

		int i,j;

		System.out.println("\nEnter the elements of the array");

		for(i=0;i<3;i++)
		{
			for(j=0;j<a[i].length;j++)
			{
				a[i][j]=sc.nextInt();
			}
		}

		System.out.println("\nYour Array :- ");

		for(i=0;i<3;i++)
		{
			for(j=0;j<a[i].length;j++)
			{
				System.out.print(a[i][j]+ " ");
			}
			System.out.println();
		}
	}
}
```

Output:

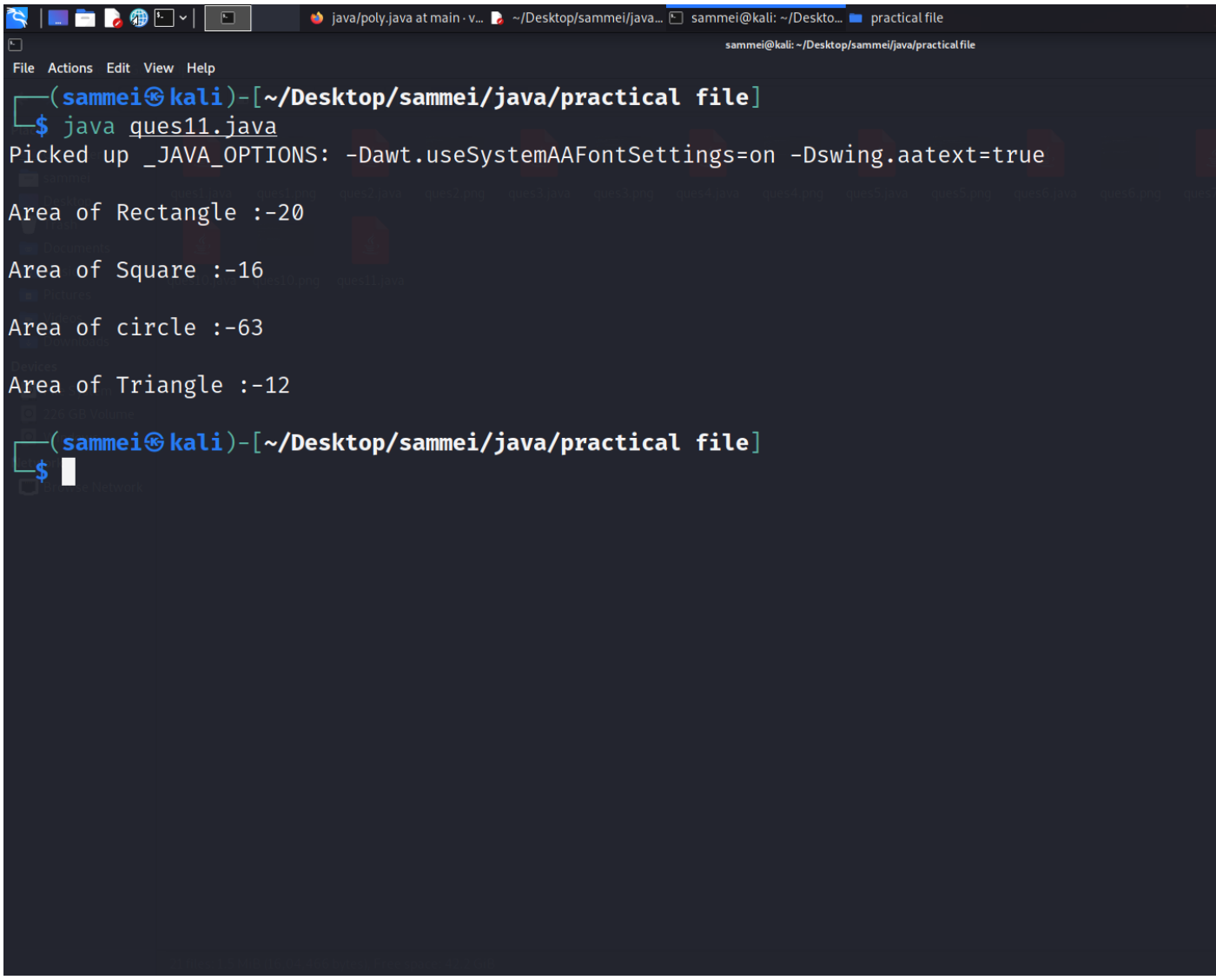

Java Program To Create ...
~/Desktop/sammei/java...
sammei@kali: ~/Deskto...
practical file
sammei@kali: ~/Desktop/sammei/java/practical file
File Actions Edit View Help
(sammei㉿kali)-[~/Desktop/sammei/java/practical file]
$ java ques10.java
Picked up _JAVA_OPTIONS: -Dawt.useSystemAAFontSettings=on -Dswing.aatext=true
Enter the elements of the array
1 2 3 4 5 6 7 8 9
Your Array :-
1 2 3
4 5 6 7
8 9
(sammei㉿kali)-[~/Desktop/sammei/java/practical file]
$

Question 11: Create a class "Shape" having area() method to calculate area. Overload the area() method for shapes like triangle, rectangle and circle.

Source Code:

```
class
Shape
	{
		int area(int x,int y)
		{
			int area=x*y;
			return area;
		}

		int area(int x)
		{
			int area=x*x;
			return area;
		}

		int area(float x)
		{
			int area=(int)(3.14*x*x);
			return area;
		}

		int area(float x,float y)
		{
			int area=(int)(0.5*x*y);
			return area;
		}

		public static void main(String args[])
		{
			Shape s=new Shape();
			int a=s.area(4,5);
			System.out.println("\nArea of Rectangle :-"+a);
			int b=s.area(4);
			System.out.println("\nArea of Square :-"+b);
			int c=s.area(4.5f);
			System.out.println("\nArea of circle :-"+c);
			int d=s.area(4.5f,5.5f);
			System.out.println("\nArea of Triangle :-"+d);
		}
	}
```

Output: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practical file
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(sammei㉿kali)-[~/Desktop/sammei/java/practical file]
$ java ques11.java
Picked up _JAVA_OPTIONS: -Dawt.useSystemAAFontSettings=on -Dswing.aatext=true
Area of Rectangle :-20
Area of Square :-16
Area of circle :-63
Area of Triangle :-12
(sammei㉿kali)-[~/Desktop/sammei/java/practical file]
$

Question 12: Create a class "Bank" having method getRateOfInterest(). Create child classes as HDFC, SBI and PNB and override getRateOfInterest() and return interest rates as 4.0, 4.5 and 5% correspondingly.
Use concept of Upcasting to implement this scenario.

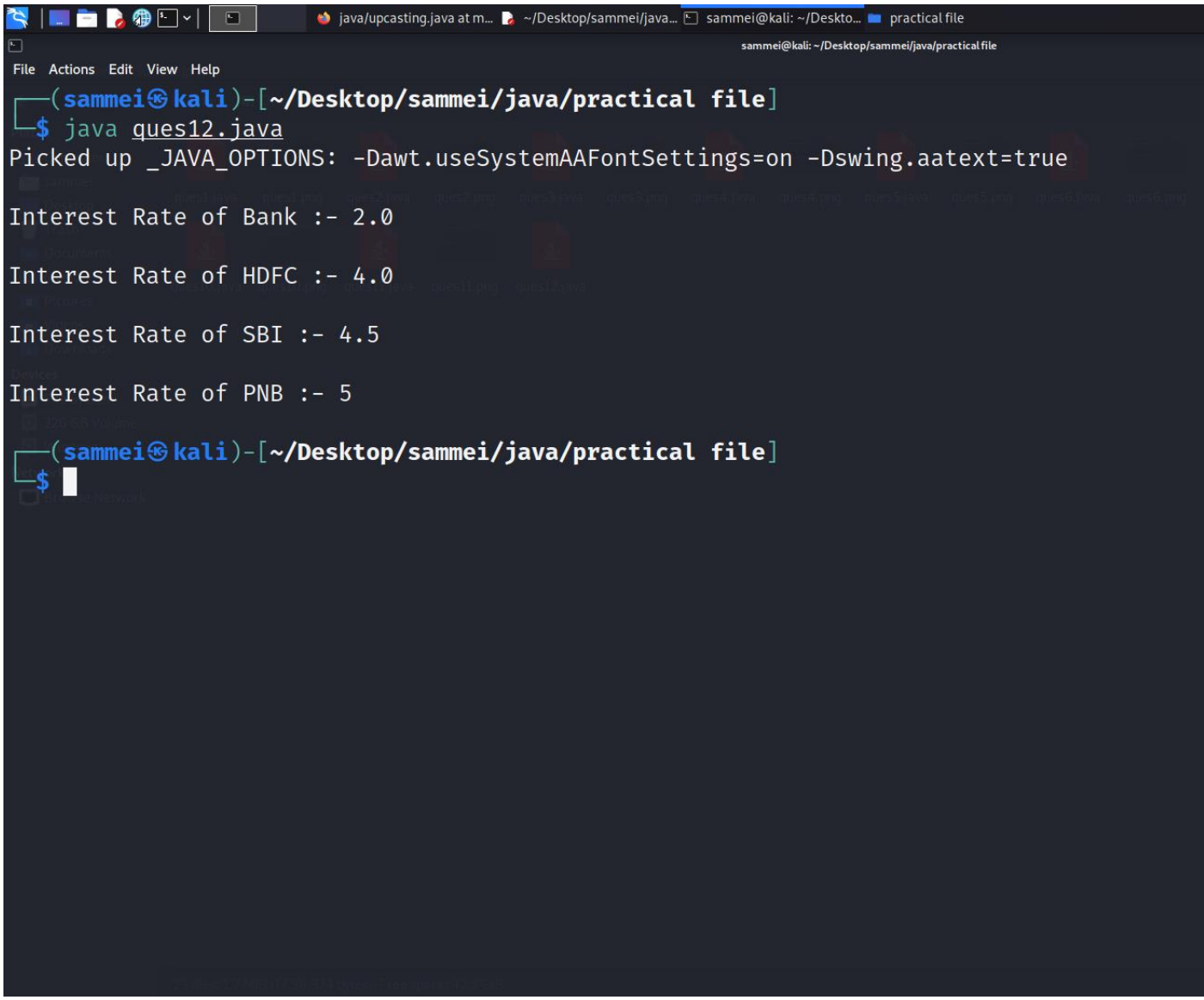
Source Code:

```
class
Bank
        {
                void getROI()
                {
                System.out.println("\nInterest Rate of Bank :- 2.0");
                }

                public static void main(String args[])
                {
                        Bank obj=new Bank();
                        obj.getROI();
                        obj=new Hdfc();
                        obj.getROI();
                        obj=new Sbi();
                        obj.getROI();
                        obj=new Pnb();
                        obj.getROI();
                }
        }
        class Hdfc extends Bank
        {
                void getROI()
                {
                System.out.println("\nInterest Rate of HDFC :- 4.0");
                }
        }
        class Sbi extends Bank
        {
                void getROI()
                {
                System.out.println("\nInterest Rate of SBI :- 4.5");
                }
        }
        class Pnb extends Bank
```

```
{
        void getROI()
        {
        System.out.println("\nInterest Rate of PNB :- 5");
        }
}
```

Output: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practical file
sammei@kali: ~/Desktop/sammei/java/practical file
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(sammei㉿kali)-[~/Desktop/sammei/java/practical file]
$ java ques12.java
Picked up _JAVA_OPTIONS: -Dawt.useSystemAAFontSettings=on -Dswing.aatext=true
Interest Rate of Bank :- 2.0
Interest Rate of HDFC :- 4.0
Interest Rate of SBI :- 4.5
Interest Rate of PNB :- 5
(sammei㉿kali)-[~/Desktop/sammei/java/practical file]
$