**List of Experiments:**

1. To implement bounded types with generics
2. 1. Create a class shape with method Area() create circle and Square which extends Class Shape. Create a generic class BoundedShape that extends shape. And implement the generics and use area function accordingly:

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| package something;  import java.util.\*;  abstract class shape  {  Scanner sc = new Scanner(System.in);  abstract void Area();  }  class circle extends shape  {  {System.out.println("Enter Radius of Circle: ");}  int r = sc.nextInt();  public void Area()  {  System.out.println("AREA OF CIRCLE: "+3.14\*r\*r);  }  }  class square extends shape  {  {System.out.println("Enter Side of Square: ");}  int s = sc.nextInt();  public void Area()  {  System.out.println("AREA OF SQUARE: "+s\*s);  }  }  class BoundedShape<T extends shape>  {  private T obje;  public BoundedShape(T obje)  {  ATHARVA KALE PRACTICAL 1 ROLL NO: 27  this.obje= obje;  }  public void gotcha()  {  this.obje.Area();  }  public static void main(String args[])  {  BoundedShape<circle> s = new BoundedShape<circle>(new circle());  s.gotcha();  BoundedShape<square> t = new BoundedShape<square>(new square());  t.gotcha();  }  } |

1. Create an Interface shape with method Area() create Circle and Square which implements Class Shape. Create a generic class BoundedShape that extends shape. And implement the generics and use area function accordingly:

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| package something;  import java.util.\*;  interface A  {  Scanner sc = new Scanner(System.in);  public void Area();  }  class circle implements A  {  {System.out.println("Enter Radius of Circle: ");}  int r = sc.nextInt();  public void Area()  {  System.out.println("AREA OF CIRCLE: "+3.14\*r\*r);  }  }  class square implements A  {  {System.out.println("Enter Side of Square: ");}  int s = sc.nextInt();  public void Area()  {  System.out.println("AREA OF SQUARE: "+s\*s);  }  }  class triangle  {  public void Area()  {  System.out.println("TRIANGLE");  }  }  class BoundedShape<T extends A>  {  private T obje;  public BoundedShape(T obje)  {  this.obje= obje;  }  public void gotcha()  {  this.obje.Area();  }  public static void main(String args[])  {  BoundedShape<circle> s = new BoundedShape<circle>(new circle());  s.gotcha();  BoundedShape<square> t = new BoundedShape<square>(new square());  t.gotcha();  }  } |

1. To implement List Interface, Set Interface, Map Interface, Lambda Expression.

1. Create an ArrayList of type Integer, add element into it  traverse the arraylist  and print the elements

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| package something;  import java.util.\*;  class BoundedShape  {  static Scanner sc = new Scanner(System.in);  static void al()  {  ArrayList<Integer> nums = new ArrayList<Integer>();  System.out.println("ENTER NO OF ELEMENTS: ");  int n=sc.nextInt();  System.out.println("Enter the "+n+" elements");  for(int i=0;i<n;i++)  {  int inp = sc.nextInt();  nums.add(inp);  }  Iterator<Integer> it = nums.iterator();  System.out.println("ARRAY IS\n");  while(it.hasNext()) {  System.out.println(it.next());  }  System.out.println(' ');  }  public static void main(String args[])  {  System.out.println(' ');  al();  }  } |

1. Create a LinkedList of type String add 5 elements and traverse the list and from both sides

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| package something;  import java.util.\*;  class BoundedShape  {  static Scanner sc = new Scanner(System.in);  static void ll()  {  LinkedList<String> li = new LinkedList<String>();  System.out.println("ENTER NO OF ELEMENTS: ");  int n=sc.nextInt();  System.out.println("Enter the "+n+" elements");  for(int i=0;i<n;i++)  {  String inp = sc.next();  li.add(inp);  }  System.out.println("LINK LIST IS\n");  for(String i:li)  {  System.out.println(i);  }  System.out.println(' ');  }  public static void main(String args[])  {  System.out.println(' ');  ll();  }  } |

1. Create an employee class (id, name, salary) create an Arralist of type employee, add 5 employees, traverse the ArrayList and print the elements, Remove one element and print the list.

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| package something;  import java.util.\*;  class employee {  static class emp{  int id;  String name;  Double sal;  emp(int id,String name,Double sal)  {  this.id=id;  this.name= name;  this.sal = sal;  }  }  static Scanner sc= new Scanner(System.in);  static ArrayList<emp> data= new ArrayList<emp>();  static void add()  {  System.out.println("Enter Details Of Employee");  System.out.print("ID : ");  int id1=sc.nextInt();  System.out.print("NAME : ");  String name1=sc.next();  System.out.print("SALARY : ");  Double salary1=sc.nextDouble();  data.add(new emp(id1, name1, salary1));  }  static void pri()  {  for(int j=0;j<data.size();j++)  {  emp e= data.get(j);  System.out.println(e.id);  System.out.println(e.name);  System.out.println(e.sal);  }  }  static void remov()  {  System.out.println("Enter the index");  int inde = sc.nextInt();  data.remove(inde);  System.out.println("Arraylist after removing data!");  pri();  }  public static void main(String args[])  {  while(true)  {  System.out.println(" ");  System.out.println("Enter the no: \n 1)ADD \n  2)Print\n 3)Remove");  int ip=sc.nextInt();  if(ip==1)  {  add();  }  else if(ip==2)  {  pri();  }  else if(ip==3)  {  remov();  }  else  {  break;  }}}} |

1. Write a Java program using Set interface containing list of items and perform the following operations:
   1. Add items in the set.
   2. Insert items of one set into another set.
   3. Remove items from the set
   4. Search the specified item in the set.

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| package something;  import java.util.\*;  public class sets {  public static void main(String args[]) {  Set<String> s= new HashSet<String>();  s.add("IRON MAN");  s.add("DOCTOR STRANGE");  s.add("CAPTAIN AMERICA");  s.add("THOR");  s.add("HULK");  s.add("VISION");  System.out.println("Priting values of SET A: \n");  Iterator<String> it=s.iterator();  while(it.hasNext())  {  System.out.println(it.next());    }  System.out.println("\n");  Set<String> s2=new HashSet<String>(s);  System.out.println("Entering values from Set A to Set B and  printing Set B:\n");  Iterator<String> it2=s2.iterator();  while(it2.hasNext())  {  System.out.println(it2.next());  }  System.out.println("\n");  System.out.println("Removing items VISION AND IRON MAN from  Set B\n ");  s2.remove("VISION");  s2.remove("IRON MAN");  System.out.println("Items removed from Set B\n");  System.out.println("Serching for removed item IRON MAN\n");  System.out.println("Does Set B contains IRON MAN?  "+s2.contains("IRON MAN"));  }  } |

1. Create a class Customer(Account\_no Integer, Name Sting), Create a HashMap of type Customer put elements, print elements, check if element with account number 101 is present or not? What is the value for Customer 101.

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| package mylab;  import java.util.\*;  public class Customer  {  int Account\_No;  String Name;  public Customer(int Account\_No,String Name)  {  this.Account\_No=Account\_No;  this.Name=Name;  }  public String getname()  {  return this.Name;  }  public int getacc()  {  return this.Account\_No;  }  public static void main(String args[])  {  HashMap<Customer,Integer> cus = new HashMap<>();  Customer c1 = new Customer(101,"IRON MAN");  Customer c2=new Customer(102,"DOCTOR STRANGE");  Customer c3 = new Customer(103,"THOR");  cus.put(c1, c1.getacc());  cus.put(c2, c2.getacc());  cus.put(c3, c3.getacc());  System.out.println("PRINTING ELEMENTS FROM HASHMAP:\n");  for (Customer i : cus.keySet())  {  System.out.println("ACCOUNT NO:" + cus.get(i) + " NAME:" + i.getname());  }  System.out.println("\nWhether there is a customer with ACCOUNT NO: 101? "+cus.containsValue(101));  for (Customer i : cus.keySet())  {  if(cus.get(i)==101)  {  System.out.println("ACCOUNT NO:" + cus.get(i) + " NAME:" + i.getname());  }  break;  }  }  } |

1. Write a Java program using Lambda Expression to calculate the following:
   1. Convert Fahrenheit to Celsius
   2. Convert Kilometers to Miles.

1)Fahrenheit to celcius

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| package something;  interface ftoc  {  public int convert(int c);  }  public class lamb {  public static void main(String[] args)  {  ftoc s1=(c)->{  return ((c-32)\*5/9);  };  System.out.println("Value in celcius is:  "+s1.convert(50));  }  } |

2) Kilometers to miles:

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| package something;  interface ktom  {  public double travel(double c);  }  public class lamb {  public static void main(String[] args)  {  ktom a=(double c)->{  return (c\*0.6213);  };  System.out.println("Value in km to miles is:  "+a.travel(5));  }  } |

3. Assignments based on web application development using JSP.

1. To design a form and use of JSP Scripting Element and JSP Directive. Display Grade of a student by accepting marks in five subjects.

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| Q1) To design a form and use of JSP Scripting Element and JSP  Directive. Display Grade of a student by accepting marks in five  subjects.  CODE:  a) index.html  <!DOCTYPE html>  <html>  <head>  <meta charset="ISO-8859-1">  <title>Insert title here</title>  </head>  <body>  <form action="find.jsp" method="POST">  <h1>Enter Your Name:</h1><input type="text"  name="name"><br>  <h1>Enter Your Marks:</h1><br>  <h2> MFCS: </h2><input type="text"  name="mfcs"><br>  <h2> AJAVA: </h2><input type="text"  name="java"><br>  <h2> ADBMS: </h2><input type="text"  name="dbms"><br>  <h2> SPM: </h2><input type="text"  name="spm"><br>  <h2> WTL: </h2><input type="text"  name="wtl"><br>  <br><br>  <input type="submit" value="SUBMIT"/>  </form>  </body>  </html>  b) grade.jsp  <%@ page language="java" contentType="text/html;  charset=ISO-8859-1"  pageEncoding="ISO-8859-1"%>  <!DOCTYPE html>  <html>  <head>  <meta charset="ISO-8859-1">  <title>Insert title here</title>  </head>  <body>  <h1>YOUR GRADE</h1>  <%  String name=request.getParameter("name");  int mfcs =  Integer.parseInt(request.getParameter("mfcs"));  int adbms =  Integer.parseInt(request.getParameter("dbms"));  int spm =  Integer.parseInt(request.getParameter("spm"));  int java =  Integer.parseInt(request.getParameter("java"));  int wtl =  Integer.parseInt(request.getParameter("wtl"));  int percent;  percent=(mfcs+adbms+spm+java+wtl)/5;  %>  <h1><%out.println("Name: "+name);%></h1>  <h2>YOUR GRADE IS: </h2>  <%  if(percent<40){  %>  <h1>F</h1>  <%}  else if(percent>=40&&percent<50){  %>  <h1>D</h1>  <% }  else if(percent>=50 && percent<60){  %>  <h1>B</h1>  <%}  else if(percent>=60 && percent<70){  %>  <h1>A</h1>  <% }  else if(percent>=70 && percent<80){  %>  <h1>A+</h1>  <% }  else{  %>  <h1>O</h1>  <%}  %>  </body>  </html> |

1. Write a program to design a simple web-based interface to a currency converter application. The interface should consist of a title, suitable instructions, and a form for entering the amount to be converted and an optional currency rate. Use text fields for entering the amount and rate.

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| a) index.html  <!DOCTYPE html>  <html>  <head>  <meta charset="ISO-8859-1">  <title>CURRENCY CONVERTER</title>  </head>  <body>  <form method="post" action="lol.jsp">  <h3>Enter the Value:</h3>  <input type="text" name="va" /><br>  <h3>Enter the rate of currency you want to convert  into</h3>  <input type="text" name="re"/><br><br>  <input type="submit" value="CONVERT" /> <br>  </form>  </body>  </html>  b) conv.jsp  <%@ page language="java" contentType="text/html;  charset=ISO-8859-1"  pageEncoding="ISO-8859-1"%>  <!DOCTYPE html>  <html>  <head>  <meta charset="ISO-8859-1">  <title>Insert title here</title>  </head>  <body>  <%  int v = Integer.parseInt(request.getParameter("va"));  int r = Integer.parseInt(request.getParameter("re"));  out.print("<h2>VALUE IN CURRENT CURRENCY: "+v+"</h2>");  out.print("<h2>RATE OF CURRENCY YOU WANT TO CONVERT:  "+r+"</h2>");  out.print("<h2>CONVERTED VALUE IN OTHER CURRENCY:  "+r\*v+"</h2>");  %>  </body>  </html> |

1. Design loan calculator using JSP which accepts Period of Time (in years) and Principal Loan Amount. Display the payment amount for each loan and then list the loan balance and interest paid for each payment over the term of the loan for the following time period and interest rate:

a. 1 to 7 year at 5.35%

b. 8 to 15 year at 5.5%

c. 16 to 30 year at 5.75%

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| a) index.html  <!DOCTYPE html>  <html>  <head>  <meta charset="ISO-8859-1">  <title>Loan Calculator</title>  </head>  <body>  <form action = "new.jsp">  <h3>Enter Principle Loan Amount</h3><input type="text"  name='pri'/><br>  <h3>Enter Time Period (IN YEARS)</h3><input type="text"  name='ti'/><br><br>  <input type="submit" value="CALCULATE"/>  </form>  </body>  </html>  b) cal.jsp  <%@ page language="java" contentType="text/html;  charset=ISO-8859-1"  pageEncoding="ISO-8859-1"%>  <!DOCTYPE html>  <html>  <head>  <meta charset="ISO-8859-1">  <title>LOAN CALCULATOR</title>  </head>  <body>  <%  double p=Double.parseDouble(request.getParameter("pri"));  int t=Integer.parseInt(request.getParameter("ti"));  double ci;  if(t<=7)  {  double n=5.35/1200;  double temp=Math.pow(1+n,t\*12);  double emi=(p\*n)\*((temp)/(temp-1));  double total=emi\*12\*t;  ci=(total-p)/t;  int ci2=0;  out.print("<h3>EMI: RS."+(int)emi+"</h3><br>");  out.print("<h3>TOTAL PAYMENT AMOUNT:  RS."+(int)total+"</h3><br>");  for(int i=1;i<=t;i++)  {  total=total-emi\*12;  ci2+=ci;  out.print("<h3>YEAR "+i+" <br>LOAN BALANCE:  RS."+(int)total+" <br>INTEREST PAID:  RS."+(int)ci2+"</h3><br>");  }  }  else if(t>=8 && t<=15)  {  double n=5.5/1200;  double temp=Math.pow(1+n,t\*12);  double emi=(p\*n)\*((temp)/(temp-1));  double total=emi\*12\*t;  ci=(total-p)/t;  int ci2=0;  out.print("<h3>EMI: RS."+(int)emi+"</h3><br>");  out.print("<h3>TOTAL PAYMENT AMOUNT:  RS."+(int)total+"</h3><br>");  for(int i=1;i<=t;i++)  {  total=total-emi\*12;  ci2+=ci;  out.print("<h3>YEAR "+i+" <br>LOAN BALANCE:  RS."+(int)total+" <br>INTEREST PAID:  RS."+(int)ci2+"</h3><br>");  }  }  else  {  double n=5.75/1200;  double temp=Math.pow(1+n,t\*12);  double emi=(p\*n)\*((temp)/(temp-1));  double total=emi\*12\*t;  ci=(total-p)/t;  int ci2=0;  out.print("<h3>EMI: RS."+(int)emi+"</h3><br>");  out.print("<h3>TOTAL PAYMENT AMOUNT:  RS."+(int)total+"</h3><br>");  for(int i=1;i<=t;i++)  {  total=total-emi\*12;  ci2+=ci;  out.print("<h3>YEAR "+i+" <br>LOAN BALANCE:  RS."+(int)total+" <br>INTEREST PAID:  RS."+(int)ci2+"</h3><br>");  }  }  %>  </body>  </html> |