Exercise 1 b: Java Programs- Classes and Arrays (1,3,4 July 2019)

1. Write a java program to get ‘n’ elements in an array. Perform the linear and binary

search.

import java.util.\*;

class searchmain

{

public static void main(String args[])

{

int n,option,number,stop,stop1;

Scanner s = new Scanner(System.in);

search opt = new search();

do

{

System.out.println("enter the number of array elements");

n = s.nextInt();

int []a = new int[n];

System.out.println("enter the array : ");

for(int i=0;i<n;i++)

a[i] =s.nextInt();

opt.sort(a,n);

do

{

System.out.println("enter the number to be searched");

number = s.nextInt();

System.out.println("enter 1: for linear search and 0:for binary search");

option = s.nextInt();

if(option != 0)

{

if(opt.linear(a,n,number) != 0)

System.out.println("the number found");

else

System.out.println("the number not found");

}

else

{

if(opt.binary(a,n,number) != 0)

System.out.println("the number found");

else

System.out.println("the number not found");

}

System.out.println("enter the number 0 to stop or 1 to continue the searching");

stop1 = s.nextInt();

}while(stop1!=0);

System.out.println("enter the number 0 to stop or 1 to continue to searc with new array");

stop = s.nextInt();

}while(stop!=0);

}

}

class search

{

void sort(int []b,int length)

{

for(int i =0; i<length;i++)

{ for(int j = 1+i;j<length;j++)

{

if(b[i] > b[j])

{

int temp;

temp = b[i];

b[i] = b[j];

b[j] = temp;

}

}

}

display(b,length);

}

void display(int []c,int length1)

{

System.out.println("the sorted array : ");

for(int k=0;k<length1;k++)

System.out.println(c[k]);

}

int linear(int []d,int length2,int searchnum)

{

System.out.println("enter");

for(int i=0;i<length2;i++)

{

if(d[i] == searchnum)

{ return 1; }

}

return 0;

}

int binary(int []b,int length,int searchnum)

{

int first,last,middle;

first = 0;

last = length-1;

middle = (first + last)/2;

while(first<=last)

{

if(searchnum > b[middle])

first = middle+1;

else if(searchnum == b[middle])

return middle;

else

last = middle -1;

middle = (first + last)/2;

}

return 0;

}

}

/\*

OUTPUT :

enter the number of array elements

5

enter the array :

1

2

3

2

6

the sorted array :

1

2

2

3

6

enter the number to be searched

2

enter 1: for linear search and 0:for binary search

1

enter

the number found

enter the number 0 to stop or 1 to continue the searching

1

enter the number to be searched

4

enter 1: for linear search and 0:for binary search

0

the number not found

enter the number 0 to stop or 1 to continue the searching

0

enter the number 0 to stop or 1 to continue to searc with new array

0

\*/

2. Write a java program to find matrix addition, subtraction and multiplication.

import java.util.\*;

class matrixmain

{

public static void main(String args[])

{

int m,n,operation;

Scanner s = new Scanner(System.in);

matrix oper = new matrix();

System.out.println("enter the operation such as 1:multi or 2:subt or 3:add");

operation = s.nextInt();

if(operation == 2 || operation == 3)

{

do

{

System.out.println("enter the row and column number same to do addition");

System.out.println("enter the row number");

m=s.nextInt();

System.out.println("enter the column number");

n=s.nextInt();

}while(m!=n);

int [][]a = new int[m][n];

oper.input(a,m,n);

int [][]b = new int[m][n];

oper.input(b,m,n);

System.out.println("the array elements of array 1 are");

oper.display(a);

System.out.println("the array elements of array 2 are");

oper.display(b);

if(operation ==3)

oper.addition(a,b);

else

oper.subtraction(a,b);

}

else

{

int m1,m2,n1,n2;

System.out.println("enter the row number for 1st array");

m1=s.nextInt();

System.out.println("enter the column number for 1st array");

n1=s.nextInt();

int [][]a = new int[m1][n1];

oper.input(a,m1,n1);

System.out.println("enter the row number for 2nd array");

m2=s.nextInt();

System.out.println("enter the column number for 2nd array");

n2=s.nextInt();

int [][]b = new int[m2][n2];

oper.input(b,m2,n2);

System.out.println("the array elements of array 1 are");

oper.display(a);

System.out.println("the array elements of array 2 are");

oper.display(b);

if(n1 == m2)

oper.multiplication(a,b);

else

System.out.println("coumn of array 1 and row of array 2 not equal");

}

}

}

class matrix

{

Scanner s = new Scanner(System.in);

void input(int [][]c,int a,int b)

{

System.out.println("enter the array elements");

for(int i=0;i<a;i++)

{

for(int j=0;j<b;j++)

{

c[i][j] = s.nextInt();

}

}

}

void display(int [][]d)

{

for(int i=0;i<d.length;i++)

{

for(int j=0;j<d[0].length;j++)

{

System.out.print(d[i][j]+"\t");

}

System.out.print("\n");

}

}

void addition(int [][]x,int [][]y)

{

int [][]addsum = new int[x.length][y.length];

for(int j=0;j<x.length;j++)

{

for(int k=0;k<x[0].length;k++)

addsum[j][k] = x[j][k] + y[j][k];

}

System.out.println("the addition of arrays is");

display(addsum);

}

void subtraction(int [][]x,int [][]y)

{

int [][]addsum = new int[x.length][y.length];

for(int j=0;j<x.length;j++)

{

for(int k=0;k<x[0].length;k++)

addsum[j][k] = x[j][k] - y[j][k];

}

System.out.println("the subtraction of arrays is");

display(addsum);

}

void multiplication(int [][]x,int [][]y)

{

int [][]addsum = new int[x.length][y[0].length];

for(int j=0;j<x.length;j++)

{

for(int k=0;k<y[0].length;k++)

{

int temp =0;

for(int l=0;l<x[0].length;l++)

{

temp += x[j][l]\*y[l][k];

}

addsum[j][k] = temp;

}

}

System.out.println("the multiplication of arrays is");

display(addsum);

}

}

/\*

OUTPUT :

enter the operation such as 1:multi or 2:subt or 3:add

1

enter the row number for 1st array

2

enter the column number for 1st array

2

enter the array elements

1

2

3

4

enter the row number for 2nd array

2

enter the column number for 2nd array

2

enter the array elements

4

3

2

1

the array elements of array 1 are

1 2

3 4

the array elements of array 2 are

4 3

2 1

the multiplication of arrays is

8 5

20 13

\*/

3. Develop a Java application to generate Electricity bill. Create a class with the

following members: Consumer no., consumer name, previous month reading,

current month reading, type of EB connection (i.e domestic or commercial).

Compute the bill amount using the following tariff.

If the type of the EB connection is domestic, calculate the amount to be paid as

follows:

 First 100 units - Rs. 1 per unit

 101-200 units - Rs. 2.50 per unit

 201 -500 units - Rs. 4 per unit

 501 units - Rs. 6 per unit

If the type of the EB connection is commercial, calculate the amount to be paid as

follows:

 First 100 units - Rs. 2 per unit

 101-200 units - Rs. 4.50 per unit

 201 -500 units - Rs. 6 per unit

 501 units - Rs. 7 per unit

import java.util.\*;

import java.util.Scanner;

class ebbill

{

public static void main(String args[])

{

int cons\_no,stop;

float prev\_month,cur\_month;

String cons\_name,type;

Scanner i = new Scanner(System.in);

eb call = new eb();

do

{

System.out.print("enter the consumer number : ");

cons\_no = i.nextInt();

i.nextLine();

System.out.print("enter the consumer name : ");

cons\_name = i.nextLine();

System.out.print("enter the previous month reading : ");

prev\_month = i.nextFloat();

System.out.print("enter the current month reading : ");

cur\_month = i.nextFloat();

i.nextLine();

System.out.print("enter the type such as dom for domestic or com for commercial : ");

type = i.nextLine();

call.assign(cons\_no,cons\_name,prev\_month,cur\_month,type);

call.calculate();

call.display();

System.out.println("enter 0 to stop or 1 to continue");

stop = i.nextInt();

}while(stop != 0);

}

}

class eb

{

int consumer\_no;

float previous\_month,current\_month;

double bill\_amount = 0;

String consumer\_name,consumer\_type;

void assign(int a,String b,float c,float d,String e)

{

consumer\_no = a;

consumer\_name = b;

previous\_month = c;

current\_month = d;

consumer\_type = e;

}

void display()

{

System.out.println("consumer number : " + consumer\_no + "\nconsumer name : " + consumer\_name + "\nprevious month reading : " + previous\_month + "\ncurrent month reading : " + current\_month + "\nconsumer type : " + consumer\_type + "\ntotal amount : " + bill\_amount);

}

void calculate()

{

if(consumer\_type.equals("dom") )

{

if(current\_month <101)

bill\_amount = current\_month \* 1;

else if(current\_month < 201 )

bill\_amount = 100 + ((current\_month - 100) \* 2.50);

else if(current\_month < 501)

bill\_amount = 350 + ((current\_month - 200) \* 4);

else

bill\_amount = 1200 + ((current\_month - 500)\* 6);

}

else

{

if(current\_month <101)

bill\_amount = current\_month \* 2;

else if(current\_month < 201)

bill\_amount = 100 + ((current\_month - 100) \* 4.50);

else if(current\_month < 501)

bill\_amount = 350 + ((current\_month - 200) \* 6);

else

bill\_amount = 1200 + ((current\_month - 500)\* 7);

}

}

}

/\*output:

enter the consumer number : 586

enter the consumer name : bharath kumar

enter the previous month reading : 500

enter the current month reading : 250

enter the type such as dom for domestic or com for commercial : dom

consumer number : 586

consumer name : bharath kumar

previous month reading : 500.0

current month reading : 250.0

consumer type : dom

total amount : 550.0

enter 0 to stop or 1 to continue

1

enter the consumer number : 530

enter the consumer name : hariharan

enter the previous month reading : 650

enter the current month reading : 275

enter the type such as dom for domestic or com for commercial : com

consumer number : 530

consumer name : hariharan

previous month reading : 650.0

current month reading : 275.0

consumer type : com

total amount : 800.0

enter 0 to stop or 1 to continue

0

\*/

4. Write a java program to create a class named ‘Student’ with name, id, dept, 3 marks

as data members. Write function to assign the inputs, calculate grade, display and

search. Perform these operations for ‘n’ number of students. [Search using id and

dept – use method overloading]

import java.util.\*;

class studentrecord

{

public static void main(String args[])

{

Scanner input = new Scanner(System.in);

student []work = new student[100];

int n,count=0,dept\_count = 0;

System.out.print("enter the number of students : ");

n=input.nextInt();

String st\_name;

int st\_id;

String st\_dept;

int []st\_marks = new int[3] ;

int search\_id;

String search\_dept;

for(int i=0;i<n;i++)

{

work[i] = new student();

input.nextLine();

System.out.print("enter the name : ");

st\_name = input.nextLine();

System.out.print("enter the id : ");

st\_id = input.nextInt();

input.nextLine();

System.out.print("enter the dept : ");

st\_dept = input.nextLine();

for(int j=0;j<3;j++)

{

System.out.print("enter the mark" +(j+1)+" : ");

st\_marks[j] = input.nextInt();

}

work[i].assign(st\_name,st\_id,st\_dept,st\_marks);

work[i].calculate();

}

System.out.print("enter the id to be searched : ");

search\_id = input.nextInt();

input.nextLine();

System.out.print("enter the dept to be searched : ");

search\_dept = input.nextLine();

System.out.println();

for(int i=0;i<n;i++)

{

System.out.println("the record"+(i+1)+" is : ");

work[i].display();

}

for(int j=0;j<n;j++)

{

if(work[j].search(search\_id))

count++;

if(work[j].search(search\_dept))

dept\_count++;

}

if(count > 0)

System.out.println("the given id found");

else

System.out.println("the given id not found");

if(dept\_count > 0)

System.out.println("the given dept found");

else

System.out.println("the given dept not found");

}

}

class student

{

String name;

int id;

String dept;

int []marks = new int[3];

String grade;

void assign(String a,int b,String c,int []d)

{

name = a;

id = b;

dept = c;

marks = d;

}

void calculate()

{

int total = (marks[0]+marks[1]+marks[2])/3;

if(total > 90)

grade = "o";

else if(total >80)

grade = "A+";

else if(total > 70)

grade ="A";

else if(total > 60)

grade = "B+";

else if(total > 50)

grade = "B";

else

grade = "RA";

}

void display()

{

System.out.println("the record is : ");

System.out.println("Name : " + name +"\nId : " + id +"\nDept : " + dept + "\nGrade : " + grade);

System.out.println();

}

boolean search(int givenid)

{

if(givenid == id)

return true;

else

return false;

}

boolean search(String givendept)

{

if(dept.equals(givendept))

return true;

else

return false;

}

}

/\*output:

enter the number of students : 2

enter the name : bharath

enter the id : 1

enter the dept : cse

enter the mark1 : 90

enter the mark2 : 90

enter the mark3 : 90

enter the name : kumar

enter the id : 2

enter the dept : cse

enter the mark1 : 80

enter the mark2 : 80

enter the mark3 : 80

enter the id to be searched : 3

enter the dept to be searched : cse

Name : bharath

Id : 1

Dept : cse

Grade : A+

Name : kumar

Id : 2

Dept : cse

Grade : A

the given id not found

the given dept found

\*/

5. Write a java program to create a class named ‘Employee’ with name, id, designation,

years-of-experience, basicpay, DA, HRA, LIC, PF and no. of hours worked. Write

functions to calculate the gross pay and net pay.

 If the designation is “Intern” then the salary can be calculated based on

working hours.

Gross salary = no.of hours worked \* hourly wage + DA as 2000 + HRA as 1000

Deductions=LIC premium amount (if employee opted for that) + PF as 500

Net salary= Gross salary – Deductions

 If the designation is “Manager” then

Gross salary = Basicpay + DA as 40% of basicpay + HRA as 10% of basicpay

Deductions=LIC premium amount (if employee opted for that) + PF as 8% of

basicpay

Net salary= Gross salary – Deductions

 If the designation is “others – Trainee, Analyst, Software engineer,

TeamLead” then

Gross salary = Basicpay + DA as 30% of basicpay + HRA as 10% of basicpay

Deductions=LIC premium amount (if employee opted for that) + PF as 8% of

basicpay

Net salary= Gross salary – Deductions

 Calculate the Payroll for ‘n’ employees and display the salary details for all

employees.

 Prepare the payslip for a particular employee.

 Promote a particular employee based on the years of experience.

import java.util.Scanner;

class Employee

{ int id,yoe,how;

String name,desig;

double bp,np,gp,hra,da,lic,pf;

Scanner s= new Scanner(System.in);

void assign()

{ int ch,n;

String []others= new String[] {"Trainee","Analyst","Software Engineer","Team lead"};

System.out.println("\nDesignation :-\n 1.Intern \n 2.Manager \n 3.Others(Trainee, Analyst, Software Engineer, Team lead )\n");

System.out.print("Enter your choice : ");

ch=s.nextInt();

switch(ch)

{ case 1: int hwage;

desig ="Intern";

System.out.print("Enter your working hours : ");

how=s.nextInt();

System.out.print("Enter your years experience : ");

yoe=s.nextInt();

System.out.print("Enter the hourly Wage : ");

hwage=s.nextInt();

bp=(how\*hwage);

da=2000;

hra=1000;

gp=bp+da+hra;

System.out.println("Have you opted LIC if \'yes\' enter the amount ,else enter \'0\' :-");

System.out.println();

lic=s.nextInt();

pf=500;

np=gp-(lic+pf);

break;

case 2: System.out.print("Enter your Basicpay : ");

bp=s.nextInt();

desig="Manager";

System.out.print("Enter your working hours : ");

how=s.nextInt();

System.out.print("Enter your years experience : ");

yoe=s.nextInt();

da=0.4\*bp;

hra=0.1\*bp;

gp=bp+da+hra;

System.out.println("Have you opted LIC if \'yes\' enter the amount else enter \'0\' :-");

System.out.println();

lic=s.nextInt();

pf=0.08\*bp;

np=gp-(lic+pf);

break;

case 3:System.out.print("\t1.Trainee\n\t2.Analyst\n\t3.Software Engineer\n\t4.Team Lead\nEnter your choice :");

n=s.nextInt();

desig=others[n-1];

System.out.print("Enter your Basicpay : ");

bp=s.nextInt();

System.out.print("Enter your working hours : ");

how=s.nextInt();

System.out.print("Enter your years experience : ");

yoe=s.nextInt();

da=0.3\*bp;

hra=0.1\*bp;

gp=bp+da+hra;

System.out.println("Have you opted LIC if \'yes\' enter the amount else enter \'0\' :-");

lic=s.nextInt();

System.out.println();

pf=0.08\*bp;

np=gp-(lic+pf);

break;

}

}

void promote()

{ if(desig.equals("Intern") && yoe>1)

{ desig="Trainee";

System.out.println("Congrats you have been promoted as Trainee..");

}

else if(desig.equals("Trainee") && yoe>2)

{ desig="Analyst";

System.out.println("Congrats you have been promoted as Analyst..");

}

else if(desig.equals("Analyst") && yoe>2)

{ desig="Software Engineer";

System.out.println("Congrats you have been promoted as Software Engineer..");

}

else if(desig.equals("Software Engineer") && yoe>3)

{ desig="Team Lead";

System.out.println("Congrats you have been promoted as Team Lead..");

}

else if(desig.equals("Team Lead") && yoe>3)

{ desig="Manager";

System.out.println("Congrats you have been promoted as Manager..");

}

}

void payslip()

{ System.out.println("----------------------------------------------");

System.out.println("\t\tPAYSLIP");

System.out.println("----------------------------------------------");

System.out.println("Name : "+name);

System.out.println("ID : "+id);

System.out.println("Designation : "+desig);

System.out.println("Basicpay : "+bp);

System.out.println("DA : "+da);

System.out.println("HRA : "+hra);

System.out.println("LIC : "+lic);

System.out.println("PF : "+pf);

System.out.println("----------------------------------------------");

System.out.println("Grosspay : "+gp);

System.out.println("Deduction : "+(lic+pf));

System.out.println("----------------------------------------------");

System.out.println("Netpay = "+np);

}

void payroll()

{

System.out.println(name+'\t'+id+'\t'+desig+"\t\t"+bp+"\t\t"+np);

}

}

class salary

{ public static void main(String args[])

{ int n,temp;

Scanner s=new Scanner(System.in);

System.out.print("Enter Total no. of Employee : ");

n=s.nextInt();

Employee[] emp=new Employee[n];

for(int i=0;i<n;i++)

{ System.out.println("\nEMPLOYEE "+(i+1)+" :- ");

emp[i]= new Employee();

System.out.print("Name : ");

emp[i].name=s.next();

System.out.print("ID : ");

emp[i].id=s.nextInt();

emp[i].assign();

emp[i].promote();

}

System.out.println("Payroll :-");

System.out.println("Name\tID\tDesignation\tBasicpay Netpay");

for(int i=0;i<n;i++)

{

emp[i].payroll();

}

System.out.println("Enter the ID no. to display PAYSLIP : ");

temp=s.nextInt();

for(int i=0;i<n;i++)

{ if(emp[i].id==temp)

emp[i].payslip();

}

}

}

/\*

OUTPUT :

C:\Users\AMR\Downloads>javac salary.java

C:\Users\AMR\Downloads>java salary

Enter Total no. of Employee : 2

EMPLOYEE 1 :-

Name : Bharath

ID : 027

Designation :-

1.Intern

2.Manager

3.Others(Trainee, Analyst, Software Engineer, Team lead )

Enter your choice : 3

1.Trainee

2.Analyst

3.Software Engineer

4.Team Lead

Enter your choice :1

Enter your Basicpay : 2000

Enter your working hours : 6

Enter your years experience : 3

Have you opted LIC if 'yes' enter the amount else enter '0' :-

0

Congrats you have been promoted as Analyst..

EMPLOYEE 2 :-

Name : kumar

ID : 056

Designation :-

1.Intern

2.Manager

3.Others(Trainee, Analyst, Software Engineer, Team lead )

Enter your choice : 2

Enter your Basicpay : 50000

Enter your working hours : 5

Enter your years experience : 5

Have you opted LIC if 'yes' enter the amount else enter '0' :-

4000

Payroll :-

Name ID Designation Basicpay Netpay

Bharath 27 Analyst 2000.0 2640.0

kumar 56 Manager 50000.0 67000.0

Enter the ID no. to display PAYSLIP :

27

----------------------------------------------

PAYSLIP

----------------------------------------------

Name : Bharath

ID : 27

Designation : Analyst

Basicpay : 2000.0

DA : 600.0

HRA : 200.0

LIC : 0.0

PF : 160.0

----------------------------------------------

Grosspay : 2800.0

Deduction : 160.0

----------------------------------------------

Netpay = 2640.0

\*/