**CSC142, Computer Science II, Project 5 assignment**

Answer all the questions and submit both document and java file to D2L. Later submission is not accepted.

1. For each question (total 13) below,
   1. estimate what is displayed on the screen without using computer,
   2. verify with computer debug mode,
   3. find explanation and correct the mistake if any.

Evaluation: submit the display only!

import java.util.Arrays;

public class HelloWorld

{

public static void main(String [] args)

{

int [] arr = {3, 7, 5};

String arrStr = Arrays.toString(arr);

System.out.println(arrStr);

int max = Math.max(3, -5);

System.out.println(max);

String s = **HelloWorld.getHello()**;

System.out.println(s);

}

**public static String getHello()** {

**return** "Hello, world!";

}

}

public class HelloInline

{

// The order of method declarations does not matter!!

public static String getHello(){

return "Hello, world!";

}

// Program execution always begins with the first line of main().

public static void main(String [] args)

{

System.out.println(**HelloInline.getHello()**);

System.out.println(**getHello()**);

// Each time the command name is executed, the method is *called*.

// We can *call* the method as many times as we like.

System.out.println(getHello());

System.out.println(getHello());

}

}

public class SimpleMath

{

public static **int** max(**int a, int b, int c**)

{

int temp = Math.max(a, b);

return Math.max(temp, c);

}

public static **double** average(**int a, int b, int c**)

{

double sum = a + b + c;

return sum / 3.0;

}

public static void main(String [] args)

{

int x = 7;

int y = 9;

int z = 4;

System.out.println(max(x,y,z));

System.out.println(average(x,y,z));

}

}

public class NestedCalls

{

public static boolean mystery1(int a)

{

if(a > 0 && **mystery2(-a)**) {

return true;

}

return false;

}

public static boolean mystery2(int b)

{

if(b + 2 > 0) {

return false;

}

return true;

}

public static void main(String [] args)

{

System.out.println("main");

int x = 3;

if(mystery1(x)) {

System.out.println("mystery1 returns true");

}

System.out.println("mystery2 = " + mystery2(x));

}

}

public class NamingAndScope

{

public static void main(String [] args) {

int x = 3;

x = x();

System.out.println(x);

x = x(x+1);

System.out.println(x);

for(int i=0; i<2; i++) {

x = x(x+3);

System.out.println(x);

}

}

public static int **x()**{

int x = 5;

return x + 7;

}

public static int **x(int x)**{

return x + 1;

}

}

public class WhatsPrinted01 {

public static void main(String [] args)

{

f(3, 1, 2, 3);

}

public static void f(int x, int a, int b, int c){  
if (x>0){  
 f(x-1, a, c, b);  
 System.out.println(x+","+a+","+b);  
 f(x-1,c, b, a);  
 }

}

}

// consider a similar question in quiz such as  
// the 6th print-out when f(4, 3, 2, 1) is called

public class WhatsPrinted02 {

public static void main(String [] args)

{

h(1, 2);

}

public static int h(int x, int y){  
System.out.println(x+","+y);  
if (x==0) return (y+1);  
else if (y==0) return h(x-1, 1);  
else return h(x-1, h(x,y-1));

}

}

// consider a similar question in quiz such as  
// the 3rd print-out when h(2, 1) is called

public class WhatsPrinted03{  
public static void main(String args[]){  
int [ ] n = {101, 142, 147, 189, 199, 207, 222, 234, 289, 296};  
System.out.println("g(n,0,8,296)="+g(n, 0, 8, 296));  
System.out.println("g(n,0,9,296)="+g(n, 0, 9, 296));  
}  
  
public static int g(int [ ] n, int first, int last, int v){  
int middle;  
if (first > last) return -1;  
middle = (first + last)/2;  
System.out.println("first("+first+"), last("+last+  
"), middle("+middle+")");   
if(n[middle] == v) return middle;  
else if ( n[middle] < v) return g(n, middle+1, last, v);  
else return g(n, first, middle-1, v);  
}  
}

public class WhatsPrinted04 {

public static void func(int A[]) {

for (int i=1; i<A.length; i++)

A[i]+=A[i-1];

}

public static void main(String args[]) {

int A[] = {10,20,30};

func(A);

System.out.println(A[2]);

}

}

public class WhatsPrinted05 {

public static int func(int A[], int B[]) {

A = B;

return A[1];

}

public static void main(String args[]) {

int A[] = {10,20,30};

int B[] = {40,50,60};

int x = func(A, B);

System.out.println(x + " " + A[1]);

}

}

import java.util.Arrays;  
  
public class WhatsPrinted06{  
public static void func (int [] a){  
int [] b = new int[a.length+1];  
for(int i = 0; i<a.length; i++)  
 b[i] = a[i];  
b[b.length-1] = 4;  
a = b;  
}  
  
public static int[] func2 (int [] a){  
int [] b = new int[a.length+1];  
for(int i = 0; i<a.length; i++)  
 b[i] = a[i];  
b[b.length-1] = 4;  
return b;  
}  
  
public static void main(String [] args){  
int [] a = {1, 2, 3};  
func(a);  
System.out.println(Arrays.toString(a));  
a = func2(a);  
System.out.println(Arrays.toString(a));  
}  
}

import java.util.\*;  
  
public class WhatsPrinted07 {   
public static void mystery1 (double [ ] d) {   
 for(int i=1; i<d.length; i++){   
 d[i] = d[i]-d[i-1];   
 }   
}   
  
public static double [ ] mystery2 (double [ ] d) {   
 double [ ] ret = new double[d.length];   
 for(int i=0;i<ret.length;i++){   
 ret[i] = d[i]-1;   
 d[i] += 1;   
 }   
// POINT 1   
 System.out.println(Arrays.toString(ret));  
 System.out.println(Arrays.toString(d));  
 return ret;   
}  
   
public static void main (String [] args) {   
double [ ] d1 = {1.0,-1.0,3.0};   
double [ ] d2 = {5.5,6.5,7.5};   
mystery1(d1);   
double [ ] d3 = mystery2(d2);   
// POINT 2   
System.out.println(Arrays.toString(d1));  
System.out.println(Arrays.toString(d2));  
System.out.println(Arrays.toString(d3));  
}   
}

import java.util.\*;  
  
public class WhatsPrinted08 {   
public static void main(String [] args){  
int [ ] n = {6, 8, 7, 1, 2, 4, 5, 3};  
n = b(n);  
System.out.println(Arrays.toString(n));  
}  
  
public static int [] b2 (int [] left, int [] right){  
 int [] output = new int[left.length+right.length];  
 int il = 0;  
 int ir = 0;  
 int io = 0;  
 while (il<left.length && ir<right.length){  
 if(left[il]<right[ir]){  
 output[io++] = left [il++];  
 }  
 else  
 output[io++] = right [ir++];  
 }  
 while (il<left.length)  
 output[io++]= left[il++];  
 while (ir<right.length)  
 output[io++]= right[ir++];  
 return output;  
}  
  
public static int [] b(int [] a)  
{  
if (a.length>1){  
 int half = a.length/2;  
 int [] left = new int [half];  
 int [] right = new int [a.length-half];  
 for(int i = 0; i<half; i++)  
 left[i] = a[i];  
 for(int i = half; i<a.length; i++)  
 right[i-half]=a[i];  
 left = b(left);  
 right = b(right);  
 a = b2(left, right);  
 }  
return a;  
} // method  
}  
// consider a similar question in quiz such as  
// the 3rd call of method ‘b’ when b(n) is called

# Develop methods

# Evaluation: Submit the Method.java which includes the following five static methods and their sample calls in main. Ensure that there is no keyboard input or display inside any of these methods. Your program should not incur any exception or unexpected interrupt during the execution.

import java.util.\*;  
  
public class Method{

public static void main(String args[]){  
System.out.println("result of isEven(3):"+isEven(3));  
displaySquare(3);  
System.out.println("result of isPrime(5):"+isPrime(5));  
int [] a ={1,2,3};  
int [] b ={};  
int [] c ={1};  
int [] d = null;  
System.out.println(Arrays.toString(md(a)));  
System.out.println(Arrays.toString(md(b)));  
System.out.println(Arrays.toString(md(c)));  
System.out.println(Arrays.toString(md(d)));  
String e = "abc";  
String f = "a";  
String g = "";  
String h = null;  
System.out.println(me(e));  
System.out.println(me(f));  
System.out.println(me(g));  
System.out.println(me(h));  
} // end of main  
// develop your (5) methods here:

…

}  
// end of class

1. Write a method that takes an integer X as an argument, and returns true if X is even, and false if X is odd.
2. Write a method that takes an integer N as an argument, and displays a square of NxN stars.
3. Write a method that takes an integer N as an argument, and returns true if N is prime, and false otherwise.
4. Write a method that reads an int array W as argument. The method will return an array so that its last element in array W will be removed at its tail from the callers’ view. For instance,

int [] a = {1, 2, 3};  
 int [] b = {};

int [] c = {1};

int [] d = null;  
 System.out.println(Arrays.toString(md(a)));  
 System.out.println(Arrays.toString(md(b)));   
 System.out.println(Arrays.toString(md(c)));   
 System.out.println(Arrays.toString(md(d)));

will print out

[1, 2]

null

null

null

1. Write a method that reads a String W as argument. The method will return a String so that its last character in String W will be removed at its tail from the callers’ view. For instance,

String e = "abc";  
String f = "a";  
String g = "";  
String h = null;  
System.out.println(me(e));  
System.out.println(me(f));  
System.out.println(me(g));  
System.out.println(me(h));  
  
will print out

ab

null

null

null