## ICS 102 Problem Set 04: Loops and Text-file I/O

1. What is the output of each of the following Java program fragments?

1a. int i=12, j=5;

int k = ++i-j++;

System.out.printf("%d %d %d",i,j,k);

1. 13 6 7
2. 12 5 8
3. 12 5 7
4. 13 6 8

1b. int sum;

for(int i=0; i<5; i++)

{ sum=0;

for(int j=0; j<7; j++)

{

if (j%2 ==0 || j%3==0)

continue;

sum += i\*j;

}

System.out.printf("%d%n",sum);

if(sum > 10) break;

}

1c. int k, m, n;

n = 0;

for(k = -7; k < 13; k += 4){

n++;

for(m = 3; m <= 6; m += 5)

n += 4;

n += 2;

}

System.out.printf("%d%n%d%n%d%n",n,k,m);

1d. int k = 0, x = 5,

boolean done = false;

do{

done = true;

x = scanner.nextInt(;

for(k = x + 1; k > 4; k--)

done = false;

} while(x != 5 && !done);

System.out.printf("%d %d%n%b%n",x,k,done);

The Input for this Program fragment is:

6 7 2 5

**Note:** **%b** is the format specifier for boolean values **true** and **false**.

1e. int i = 10, j = -6;

while(i < 12){

while(-1 > j){

System.out.printf("%d %d%n",i,j);

j = j + 3;

}

i = i + 1;

}

System.out.printf("%d %d%n",i,j);

1f.

for(int k = 1; k <= 4; k++){

for(int m = k; m >= 1; m--){

System.out.printf("%d", m);

}

System.out.println();

}

A. 1

21

321

4321

B. 1234

123

12

1

C. 1

12

123

1234

D. 4321

321

21

1

1g. int i = 0;

while(i <= 2)

System.out.printf("%d ", ++i);

A. 0 1 2

B. 0 1 2 3

C. Error: Infinite loop

D. 1 2 3

1h. int i,j, count1 = 0, count2 = 0;

for(i=0; i<10; i++)

{ count1++;

for(j=5; j>=1; j--)

{ count2++; }

}

System.out.printf("%d %d", count1, count2);

1. 10 50
2. 9 45
3. 10 15
4. 9 14

1i. int i = 5;

do {

i++;

System.out.printf("%d", i);

i = i + 2;

} while (i <= 10);

1. 6 8 10
2. 5 7 9
3. 6 8
4. 6 9

1j. int k = 3, m = 4,count = 0;

for(k = 0; k <= 4; k+=2)

for(m = 5; m > 0; m=m-2)

count+=1;

System.out.printf("%d",count);

1. 8
2. 9
3. 15
4. 12

1k. int i,j,k;

for(i=7; i > 4; i--){

System.out.printf("%d ", i);

for(j=1; j < i; j+=2)

System.out.printf("%d ", j);

System.out.println();

}

|  |  |  |  |
| --- | --- | --- | --- |
| 1. 5 1 3 6 1 3 5 7 1 3 5 | 1. 7 1   6 1 3  5 1 3 | 1. 7 1 3 5   6 1 3  5  5 1 3 | 1. 1 3 5   1 3 5  1 3 |

1. In the Java program fragment below, how many times is the string "KFUPM" printed?

int x;

for(x = 1; x <= 10; x++){

if(x < 5)

continue;

if(x > 7)

break;

System.out.printf("KFUPM");

}

A. 3 times

B. 1 time

C. 2 times

D. 4 times

1. In the Java program fragment below, how many times is the string "ICS102" printed?

int x;

for(x = 1; x <= 15; x++){

if(x%2 == 0)

continue;

if(x > 7)

break;

System.out.println("ICS102");

}

1. 3 times
2. 4 times
3. 15 times
4. 7 times

**The next 2 questions (4and 5) are based on the following code fragment:**

int k, m,count=0;

for(k = 1; k <= 4; k++)

for(m = 4; m >= 1; m = m-2)

count++;

1. What is the value of **count** after executing the above nested loops?
2. 8
3. 10
4. 6
5. 12
6. What are the values of **k** and **m**, after executing the above nested loops?
7. k=4 and m=2
8. k=5 and m=0
9. k=5 and m=2
10. k=4 and m=0
11. Which one of the Java code fragments below will produce the following output?

BBBBBBBBBB

BBBBBBBB

BBBBBB

BBBB

BB

|  |  |
| --- | --- |
|  | |
| 1.  for(int n = 5; n>= 1; n--){  for(int k=1; k<=2\*n; k++)  System.out.print("B");  System.out.println();  } | 2.  for(int n = 1; n <= 5; n++){  for(int k=1; k <= 2\*n; k+=2)  System.out.print("B");  System.out.println();  } |
| 3.  for(int n = 5; n>=1; n--){  for(int k=1; k<=n; k+=2)  System.out.print("B");  System.out.println();  } | 4.  for(int n = 1; n<=5; n++){  for(int k=1; k<=n; k+=2)  System.out.print("B");  System.out.println();  } |

A. code 2

B. code 3

C. code 4

D. code 1

1. Rewrite the following program fragment by converting all the "for" loops to their equivalent "while" loops:

double sum = 0;

int i, j;

for(j = 20; j <= 201; j += 10)

for(i = -j; i <= 5; i += j/2)

sum += i/j;

System.out.printf("%f%n",sum);

1. Consider the following Java program fragment:

int x = 20, p = 1, n;

while(x >= 5){

n = 5;

while(n <= x){

p += n;

n++;

}

x = x - 3;

}

|  |  |
| --- | --- |
| Which of the following Java code fragments is equivalent to the above code? | |
| 1. int x, p = 1, n;  for (x = 20 ; x >= 5 ; n = 5)  for (x = x - 3 ; n <= x ; n++ )  p += n; | 2. int x, p = 1, n;  for(x = 20 ; x >= 5 ; x = x - 3)  for(n = 5 ; n <= x ; n ++)  p += n; |
| 3. int x, p = 1, n;  for(x = 20; x >=5 ; x = x - 3 )  for(n ++; n <= x ; n = 5)  p += n; | 4. int x, p = 1, n;  for(x = 20 ; x >= 5 ; x = x - 3)  for(n = 5 ; n <= x ; p += n )  n ++; |

A. code 1

B. code 3

C. code 4

D. code 2

1. Which of the following while-loop is equivalent to the **for** loop shown below:

for(int j = 0; j < 10; j+=1)

System.out.printf(" %d ", j);

|  |  |
| --- | --- |
| A. int j;  while (j < 10){  System.out.printf(" %d ", j);  j ++;  } | B. int j = 0;  while (j < 10){  System.out.printf(" %d ", j);  j++; } |
| C. while (int j=0; j < 10){  System.out.printf(" %d ", j);  j ++;  } | D. int j = 0;  while (j < 10){  j++;  System.out.printf("%d ", j); } |

1. Select the correct answer which will enable the code below to print the odd numbers from 1 to 51 (i.e., 1, 3, 5, …51):

int i;

for(\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_)

System.out.printf("%d ",i);

1. i = 1; i <= 51; i +=2
2. i = 1; i < 51; i+2
3. i = 1; i <= 51; i ++
4. i = 1; i <= 51; i+2
5. Consider the following code fragment:

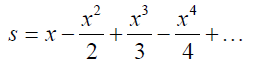
int i;

for(\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_)

System.out.printf("%d ", i\*i);

Complete the loop parameters to get the following output: 100 64 36 16 4

1. i=100; i > 0; i=i/10-2
2. i=10; i > 0; i-=1
3. i=10; i >= 0; i=i-2
4. i=10; i > 0; i=i-2
5. What is an input stream?
6. What Java input stream is connected to the keyboard?
7. What Java output stream is connected to the screen?
8. What Java statement handles exceptions?
9. What is a Java checked exception?
10. Give two examples of Java checked exceptions.
11. Give three examples of Java unchecked exceptions.
12. Write a Java statement to read a single character from a text-file using a Scanner object.
13. Write a Java statement to read a single character from a text-file using a FileInputStream object.
14. What must the main method that performs File I/O and that does not handle FileNotFoundException have?
15. Write a Java program fragment to open a text-file for appending.
16. Write a Java program that counts, in a text-file, the number of lines, the number of lowercase letters, and the number of uppercase letters. The output must be both on the screen and in another text-file.
17. Write a Java program to evaluate the series below given an input x such that **-1 ≤ x ≤ 1**:



The calculation should terminate when the last term has reached an absolute value less than **10-4**. Your

program must validate the input x; it must loop as long as the input is not valid.

1. The Fibonacci sequence is a sequence of numbers such that the first two elements are defined to be 0 and 1, and each of the other elements is the sum of the previous two numbers.

0, 1, 1, 2, 3, 5, 8, 13, 21, . . .

Write a Java program that reads and validates a value for *n* and then displays the first *n ele*ments of the

Fibonacci sequence, **five elements per line**.