Exercises If and If-else Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period:\_\_\_\_\_\_

Determine the outcome of each piece of code:

1. int age = 19;

if (age >= 18)

System.out.println("You may vote");

else

System.out.println("You are not allowed to vote");

2. int age = 15;

if (age > 15)

System.out.println("You may get a driver's license");

else

if (age < 15)

System.out.println("You may not drive");

else

System.out.println("You may get a permit");

3. int x = 5;

if (x > 0)

{

x = x + 15;

System.out.println(x);

}

else

System.out.println("Error");

4. int x = 5;

if (x > 6)

x = x + 1;

else

if (x > 3)

x = x + 2;

else

x = x + 5;

System.out.println(x);

5. Write a piece of code to do the following:

If the user enters 1, display your name. If the user enters 2, display your

favorite color. Otherwise, display your year (freshman, sophomore, etc). Here's a

piece of code to get your started:

int num;

System.out.println("Please enter 1 or 2");

num = input.nextInt();

6. Write a piece of code to do to the following:

If the user enters 1, add x and y and display the result. If the user enters 2,

multiply x and y and display the result. Otherwise, display "Good-bye!".

int x = 5, y = 3;

int num;

System.out.println("Please enter 1 or 2");

num = input.nextInt();

Exercises For-loops Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period:\_\_\_\_\_\_

State how many times each block of code will cause karel to move.

**Warning: some loops may be infinite, and some may not run at all.**

**1) for** (**int** i=0; i < 10; i++)

*karel*.move(); \_\_\_\_\_\_\_\_\_\_

**2) for** (**int** i=1; i <= 10; i++)

*karel*.move(); \_\_\_\_\_\_\_\_\_\_

**3) for** (**int** i=10; i >=1; i--)

*karel*.move(); \_\_\_\_\_\_\_\_\_\_

**4) for** (**int** i=10; i > 0; i--)

*karel*.move(); \_\_\_\_\_\_\_\_\_\_

**5) for** (**int** i=0; i > 10; i++)

*karel*.move(); \_\_\_\_\_\_\_\_\_\_

**6) for** (**int** i=1; i <= 10; i--)

*karel*.move(); \_\_\_\_\_\_\_\_\_\_

**7) for** (**int** i=10; i > 1; i++)

*karel*.move(); \_\_\_\_\_\_\_\_\_\_

**8) for** (**int** i=10; i >= 1; i++)

*karel*.move(); \_\_\_\_\_\_\_\_\_\_

**9) for** (**int** i=1; i < 10; i++)

*karel*.move(); \_\_\_\_\_\_\_\_\_\_

**10) for** (**int** i=0; i < 10; i=i+2)

*karel*.move(); \_\_\_\_\_\_\_\_\_\_

**11) for** (**int** i=0; i <= 10; i=i+2)

*karel*.move(); \_\_\_\_\_\_\_\_\_\_

**12) for** (**int** i=0; i <= 10; i=i-5)

*karel*.move(); \_\_\_\_\_\_\_\_\_\_

**13) for** (**int** i=0; i < 10; i=i\*2)

*karel*.move(); \_\_\_\_\_\_\_\_\_\_

**14) for** (**int** i=0; i <= 10; i++)

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

*karel*.move(); \_\_\_\_\_\_\_\_\_\_

For the following, make the code body write the value of i:

Example: write a for loop that starts at 0 and ends at 10 exclusive:

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

System.out.print(i + “ “);

**15)** write a for-loop that starts at 3, goes up to and including 200 and increases 1 at a time:

**16)** write a for-loop that starts at 64, goes down to but not including 0 and decreases by cutting itself in half each time:

**17)** write a for-loop that traverses through every even number between 64 and 128 inclusive:

**18)** write a for-loop that traverses through every multiple of 5 between 1 and 100 inclusive.

**19)** write a for loop that traverses through every power of 2 between 1 and 512 exclusive.

**20)** write a for loop that repeats 5 times (by any means), and then repeat that process 100 times:

Exercises Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

If statement & Loops I Period:

Show the output of the following blocks of code given:

final int MIN = 10, MAX = 20;

1) MIN MAX num output

int num = 15; 10 20

**if** (num < MAX)

{

System.out.println (num);

num = num + 1;

}

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2) MIN MAX num output

int num = 15; 10 20

**while** (num < MAX)

{

System.out.println (num);

num = num + 1;

}

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3) MIN MAX num output

int num = 15; 10 20

**if** (num < MAX)

{

num = num + 1;

System.out.println (num);

}

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4) MIN MAX num output

int num = 15; 10 20

**while** (num < MAX)

{

num = num + 1;

System.out.println (num);

}

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5) MIN MAX num output

int num = 15; 10 20

**if** (num < MAX)

{

System.out.println (num);

num = num - 1;

}

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6) MIN MAX num output

int num = 15; 10 20

**while** (num < MAX)

{

System.out.println (num);

num = num - 1;

}

7) MIN MAX num output

int num = 15; 10 20

**if** (num > MIN)

{

System.out.println (num);

num = num - 1;

}

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

8) MIN MAX num output

int num = 15; 10 20

**while** (num > MIN)

{

System.out.println (num);

num = num - 1;

}

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

9) MIN MAX num output

int num = 15; 10 20

**if** (num < MAX)

{

System.out.println (num);

num += 2;

}

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

10) MIN MAX num output

int num = 15; 10 20

**while** (num < MAX)

{

System.out.println (num);

num += 2;

}

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

11) MIN MAX num output

int num = 15; 10 20

**if** (num < MAX)

{

if (num%2 == 0)

System.out.println (num);

num++;

}

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_12) MIN MAX num output

int num = 15; 10 20

**while** (num < MAX)

{

if (num%2 == 0)

System.out.println (num);

num++;

}

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Exercises – Error Checking** Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Period\_\_\_\_\_\_\_\_\_\_\_

A program can be made more robust by error checking user input. This can help avoid exception throwing as well as output that may not make sense. Here is an example:

System.out.println("Enter a number greater than 10");

num = input.nextInt();

while (num <= 10)

{

System.out.println("That number is invalid because it is not greater than 10");

System.out.println("Enter a positive number");

num = input.nextInt();

}

The general outline is:

ask for user input

read in user input

while (user input is invalid)

{

tell the user why their input is bad

ask for and read in the user input again

}

Write the error checking required for each situation:

1) double x;

System.out.println("Enter a number to find the square root of");

x = input.nextDouble();

2) int age;

System.out.println("Enter your age in years");

age = input.nextInt();

3) double n;

System.out.println("Enter a number to find the reciprocal of (1/n)");

n = input.nextDouble();

4) int rating;

System.out.println("Enter a rating between (1-100), 1 being the worst and 100 being the best");

rating = input.nextInt();

5) String option;

System.out.println(“Pick an option: a) to add, s) to subtract, m) to multiply”);

option = input.nextLine();

You can use modulous (%) to check the divisibility of numbers in error checking:

If num%5 == 0, it means that there is NO remainder between num and 5,

and thus num IS divisible by 5 (num is a multiple of 5).

If num%3 != 0, it means that there IS a remainder between num and 3,

and this num is NOT divisible by 3 (num is not a multiple of 3).

Complete the conditions for the following error checking situations:

6) System.out.println(“Enter a number that is a multiple of 10”);

num = input.nextInt();

while( )

{

System.out.println(“This is not a multiple of 10. Enter a number that is”);

num = input.nextInt();

}\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

7) System.out.println(“Enter an even number”);

num = input.nextInt();

while( )

{

System.out.println(“This is not an even number. Enter a number that is”);

num = input.nextInt();

}\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

8) System.out.println(“Enter an odd number”);

num = input.nextInt();

while( )

{

System.out.println(“This is not an odd number. Enter a number that is”);

num = input.nextInt();

}\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

9) System.out.println(“Enter a degree amount that is not a multiple of 180”);

deg = input.nextDouble();

while( )

{

System.out.println(“This is a multiple of 180. Enter a number that isn’t”);

deg = input.nextDouble();

}

ans = 1 / Math.sin(deg \* Math.PI / 180.0);

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10) System.out.println(“Enter an even number that is not a multiple of 4”);

num = input.nextInt();

while( )

{

System.out.println(“Invalid -Enter an even number that is not a multiple of 4”);

num = input.nextInt();

}\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Exercises – Randomness** Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Period\_\_\_\_\_\_\_\_\_\_\_

Example:

Given an int called ran, write the code that will return a number between 5 and 15, including both i.e., [5,15]:

ran = (int)(Math.random() \* 11) + 5;

# Given an int called ran, write the code that will:

1. return a random number between 0 and 100, exclusive (including 0, not including 100).
2. return a random number between 7 and 21, inclusive.
3. return the result of a flipped coin (0 – heads, 1- tails).
4. return the result of a rolled die (1-6, inclusive).
5. Complete the code that will ask the user to enter a minimum value (min) and a maximum value (max). The program will then find a random number between min and max inclusive.

int min, max, pick;

System.out.println(“enter minimum value”);

min = input.nextInt();

System.out.println(“enter a maximum value”);

max = input.nextInt();

pick =

System.out.println(“The computer picks: “ + pick);

1. Consider the titles of three songs that you like. Write the code that will pick one of the three at random to display on the screen.

1. Write a program where the user is asked to enter a number between 2 and 12. The computer will roll two 6-sided dice. If the sum of the two dice is the same as the user’s number, it reports that they win. If either of the two dice is the same as the user number, the program reports that they tie. If neither case is true, the program reports that the user lost.