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**Problem 1 – 12 pts.**

What does the following code print?

#include <stdio.h>

int main()

{

int a = 24;

int b = 42;

while (b != 0)

{

int t = b;

b = a % b;

a = t;

printf("a = %d, b = %d\n", a, b);

}

return 0;

}

OUTPUT   
a = 42, b = 24  
a = 24, b = 18  
a = 18, b = 6  
a = 6, b = 0

**Problem 2 – 10 pts**

What does the following code print?

#include <stdio.h>

int main()

{

int a = 3;

int b = 6;

while (a < b)

{

a += 2;

b++;

printf("a = %d, b = %d\n", a, b);

}

return 0;

}

OUTPUT:

a = 5, b = 7

a = 7, b = 8

a = 9, b = 9

**Problem 3 – 12 pts.**

What does the following code print?

#include <stdio.h>

int main()

{

int a = 65;

int limit = 50;

while (a != limit)

{

a = limit - (limit-a)/2;

printf("a = %2d\n", a);

}

return 0;

}

OUTPUT:

a = 57

a = 53

a = 51

a = 50

**Problem 4 –**

What does the following code print?

#include <stdio.h>

int main()

{

int x = 7;

int y = -10;

int z = 5;

do

{

printf("%d %d %d\n", x, y, z);

if (x == 2)

{

x -= y;

}

else

{

x -= z;

}

printf("%d %d %d\n", x, y, z);

x -= y;

z =- x;

} while (x < 7);

printf("%d %d %d\n", x, y, z);

return 0;

}

OUTPUT:

7 -10 5

2 -10 5

12 -10 17

**Problem 5 – pts**

The extraterrestrials living in the planet Numerion revere a specific type of integers N. In particular, for those creatures, an integer N is holy if there exists an integer i >= 1 such that:

N = i\*i + i

Here are some examples of holy numbers:

2 (because 2 = 1\*1 + 1)

6 (because 6 = 2\*2 + 2)

12 (because 12 = 3\*3 + 3)

In a file called problem5.c, write a program that:

* Asks the user to enter an integer N. It is OK if your program crashes when the user does not enter a valid integer.
* Prints out whether that number is a holy number in planet Numerion.
* The program should continue running until the user enters -1 to quit.

Here is an example of the output from this program:

Enter an integer N or -1 to quit: 4

4 is not a holy number in Numerion.

Enter an integer N or -1 to quit: 6

6 is a holy number in Numerion, because 2\*2+2 = 6

Enter an integer N or -1 to quit: -1

Note that it kept running until I entered -1. **Hint**: This is a smoking gun problem, like determining if a number is prime.

**Problem 6 – 18 pts**

In a file called SkipMultiples.java, write a program write a program satisfying these specs:

* It asks the user to enter an integer called low.
* It asks the user to enter an integer called high.
* If low ≤ high, the program prints, in ascending order, all integers between low and high (including low and high), except for multiples of 4.
* If low > high, the program just prints "no numbers found" and exits.

For example, if the user enters 7 for low and 13 for high, your program output should look EXACTLY like this:

Enter low: 7

Enter high: 13

7

9

10

11

13

As another example, if the user enters 5 for low and 4 for high, your program output should look EXACTLY like this:

Enter low: 5

Enter high: 4

no numbers found

**Problem 7 – 30 pts.**

In a file called problem7.c, write a program that:

* Asks the user to enter an integer M.
* Asks the user to enter an integer N.
* Prints out the number of multiples of 11 that are greater than or equal to M and less than or equal to N.

For example: if the user enters 10 and 40, the multiples of 11 between those two numbers are 11, 22, 33, and your program output should look EXACTLY like this:

Enter an integer M: 10

Enter an integer N: 40

3 numbers between 10 and 40 are multiples of 11.

As another example: if the user enters 40 and 10, there are no multiples of 11 that are >= 40 and <= 10, and your program output should look EXACTLY like this:

Enter an integer M: 40

Enter an integer N: 10

0 numbers between 40 and 10 are multiples of 11.

As another example: if the user enters 70 and 110, the multiples of 11 between those numbers are 77, 88, 99, 110, and your program output should look EXACTLY like this:

Enter an integer M: 70

Enter an integer N: 110

4 numbers between 70 and 110 are multiples of 11.

**Submission:**

Place this Word document and the three program source files (problem5.c, problem6.c, and problem7.c) in a folder and zip the folder. Submit the zip file in Canvas. Make sure that the zip file contains your source code and Word document before submitting.