

Quiz 4 Key (High =100, Low =52, Mean =82)
BE-104, Dr. C. S. Tritt, Spring '05

Each of the following 2 problems is worth the same amount. This is a closed notes, closed book, closed laptop, closed neighbor quiz. Work carefully to avoid making careless mistakes.

1. What output would be produced when the main method in the following file was run?

```
public class Quiz {  
  
    public static void main(String[] args) {  
        int sum = 0;  
        int j = 3;  
        do {  
            j = j - 1;  
            for (int i = 1; i <= 5; i = i + 1) {  
                sum = sum + 1;  
            }  
            System.out.println("J = " + j);  
        } while (j > 0);  
        System.out.println("Sum = " + sum);  
    }  
}
```

Sum goes up by 5 each time around the inner loop. The outer loop causes the inner loop to execute 3 times. The resulting output is:

```
J = 2  
J = 1  
J = 0  
Sum = 15
```

J = 's correct, but Sum = 12 or 3, -2; J = 's wrong and sum right, -8; J = 's wrong and sum wrong, -15; other "answers," -25.

2. Write a Java main method that prompts the user to enter an integer value, reads it and then displays one of the following messages based on the value entered:

You entered a zero.
What you entered was: odd and positive.
What you entered was: even and positive.
What you entered was: odd and negative.
What you entered was even and negative.

An easy test for oddness (for a number, not a professor) is that if $x \% 2$ is 1, x is odd.

```

// Problem 2 option A -

System.out.println("Enter an integer: ");
Scanner sysin = new Scanner(System.in);
int value = sysin.nextInt();
if (value == 0) {
    System.out.println("You entered a zero.");
} else {
    System.out.print("What you entered was: ");
    if ((value % 2) == 0) {
        System.out.print("even ");
    } else {
        System.out.print("odd");
    }
    System.out.print("and ");
    if (value > 0) {
        System.out.println("positive.");
    } else {
        System.out.println("negative.");
    }
}

// Problem 2 option B -

System.out.println("Enter an integer: ");
value = sysin.nextInt();
if ((value % 2) == 1 && value > 0) {
    System.out.println("What you entered was: odd and positive.");
} else if ((value % 2) == 0 && value > 0){
    System.out.println("What you entered was: even and positive.");
} else if ((value % 2) == -1 && value < 0){ // Hard to find error.
    System.out.println("What you entered was: odd and negative.");
} else if ((value % 2) == 0 && value < 0){
    System.out.println("What you entered was: even and negative.");
} else {
    System.out.println("You entered a zero.");
}

```

Many other solutions are also possible. The hint about using $x \% 2$ being 1 as a test for oddness is correct, but doesn't work for negative numbers. A better test is $x \% 2$ being 0 for evenness which works for positive and negative values of x .

Using *if*'s in place of *else if*'s, no penalty; not testing for $\text{num} \% 2 == -1$, no penalty (my bad); "extra" tests with *else if*'s, no penalty; trying to use *switch/case*, -10; using single equals for equality test and/or not using $\&\&$ and/or $\|$ correctly, -7; minor language errors (like calling input variable *int* or putting extra ;'s in if expressions, -3; not getting input correctly, -10; input type mismatch, -5; other multiple errors, -20 to -40.

Using a "flag" like boolean `even = num % 2 == 0;` is okay, but don't do redundant flags (like odd and even, use `!even` instead) or *else if*'s where *else*'s will do. Un-needed complexity makes programs harder to write, debug and maintain. Using a *switch/case* on $\text{num} \% 2$ would be possible, but not particularly desirable.