Tutorial Quiz #10 — Solutions

Using "big-Oh" notation, analyze the running time of the following code fragment, as a function of `n`.

```
for (int i = n; i > n / 2; i--) {

    if (i > 50)

        sum += 2;

    else

        sum += 1;

}
```

Answer:

- The first branch of the `if`-statement takes time $\mathcal{O}(1)$.
- The second branch of the `if`-statement takes time $\mathcal{O}(1)$.
- The `if` test takes time $\mathcal{O}(1)$.
- Hence, the time for each iteration of the loop is $\mathcal{O}(1)$.
- The loop iterates $\mathcal{O}(n)$ times.
- Therefore, the total time for the loop is $\mathcal{O}(n)$.

Marking Scheme:

A. 1 mark for having "$\mathcal{O}(1)$" for each branch of the `if`-statement

B. 1 mark for having "$\mathcal{O}(1)$" for the `if` test

C. 1 mark for having "$\mathcal{O}(1)$" in total for each iteration of the loop

D. 1 mark for having "$\mathcal{O}(n)$ iterations" for the loop

E. 1 mark for multiplying the time for each iteration by the number of iterations to get the total time for the loop

Common Errors: