

Question 1: Methods and Control Structures**9 points****Canonical solution**

- (a)** `public int getScore()` **4 points**
- ```
{
 int score = 0;

 if (levelOne.goalReached())
 {
 score = levelOne.getPoints();

 if (levelTwo.goalReached())
 {
 score += levelTwo.getPoints();

 if (levelThree.goalReached())
 {
 score += levelThree.getPoints();
 }
 }
 }

 if (isBonus())
 {
 score *= 3;
 }

 return score;
}
```
- (b)** `public int playManyTimes(int num)` **5 points**
- ```
{
    int max = 0;

    for (int i = 0; i < num; i++)
    {
        play();
        int score = getScore();
        if (score > max)
        {
            max = score;
        }
    }

    return max;
}
```

(a) `getScore`

Scoring Criteria		Decision Rules	
1	Calls <code>getPoints</code> , <code>goalReached</code> , and <code>isBonus</code>	Responses will not earn the point if they <ul style="list-style-type: none"> fail to call <code>getPoints</code> or <code>goalReached</code> on a <code>Level</code> object call <code>isBonus</code> on an object other than <code>this</code> (use of <code>this</code> is optional) include parameters 	1 point
2	Determines if points are earned based on <code>goalReached</code> return values	Responses can still earn the point even if they <ul style="list-style-type: none"> calculate the score total incorrectly call <code>goalReached</code> incorrectly fail to distinguish all cases correctly Responses will not earn the point if they <ul style="list-style-type: none"> fail to use a nested <code>if</code> statement or equivalent 	1 point
3	Guards update of score for bonus game based on <code>isBonus</code> return value	Responses can still earn the point even if they <ul style="list-style-type: none"> triple the calculated score incorrectly update the score with something other than tripling call <code>isBonus</code> incorrectly Responses will not earn the point if they <ul style="list-style-type: none"> use the <code>isBonus</code> return value incorrectly 	1 point
4	Initializes and accumulates appropriate score (<i>algorithm</i>)	Responses can still earn the point even if they <ul style="list-style-type: none"> call methods incorrectly, as long as method calls are attempted fail to return the score (<i>return is not assessed</i>) Responses will not earn the point if they <ul style="list-style-type: none"> calculate the score total incorrectly triple the calculated score incorrectly 	1 point
Total for part (a)			4 points

(b) `playManyTimes`

Scoring Criteria		Decision Rules	
5	Loops <code>num</code> times	Responses can still earn the point even if they <ul style="list-style-type: none"> • return early 	1 point
6	Calls <code>play</code> and <code>getScore</code>	Responses will not earn the point if they <ul style="list-style-type: none"> • call either method on an object other than <code>this</code> (use of <code>this</code> is optional) • include parameters 	1 point
7	Compares a score to an identified max or to another score	Responses can still earn the point even if they <ul style="list-style-type: none"> • make the comparison outside the loop • call <code>getScore</code> incorrectly • fail to call <code>play</code> between calls to <code>getScore</code> 	1 point
8	Identifies the maximum score (<i>algorithm</i>)	Responses will not earn the point if they <ul style="list-style-type: none"> • fail to initialize the result variable • compare a score to an identified max or to another score outside the loop • fail to call <code>play</code> exactly once each time through the loop 	1 point
9	Returns identified maximum score	Responses can still earn the point even if they <ul style="list-style-type: none"> • calculate the maximum score incorrectly Responses will not earn the point if they <ul style="list-style-type: none"> • assign a value to the identified maximum score without any loop or logic to find the maximum 	1 point
Total for part (b)			5 points
Question-specific penalties			
None			
Total for question 1			9 points