**TRW222**

**TEST 4 Detailed Modelling**

**7 Sept 2016**

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Student No\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |
| --- | --- |
| 1. Bepaal die looptyd van al drie dele van lyn 8 in konteks van hierdie programdeel. Jy hoef nie die uitdrukkings te vereenvoudig nie. Maak gebruik van die vereenvoudigde model. (6) | *1. Determine the running time of all three parts of line 8 in context of this program segment. You need not simplify the expressions.* ***Use******the simplified model****. (6)* |
| 1 public class Question1.3  2 {  3 public static int numbers (int n)   1. { 2. int prod = 1; 3. for (int i=1; i<n; i++ ) 4. { 5. for ( int j=0; j<i; ++j) 6. prod \*=j; 7. } 8. return prod; 9. } 10. } | |
| *8a*. int j=0; 2(n-1) | |
| 8b. j<i; | |
| 8c. ++j | |

|  |  |
| --- | --- |
| 2 Vereenvouding die uitdrukking mbv die gegewe gelykheid (6) | 1. *Simplify the expression by using the given equation to simplify the ex*  (6) |
| Vereenvouding / Simplify 4 gebruik / use | |
| 4  =  1 mark  =  1 mark  =  1 mark  =  1 mark  =  1 mark  =  1 mark | |

|  |  |
| --- | --- |
| 3 Gee die definisie van die asimptotiese bogrens O(n) (3) | 1. *Dive the definition of the asymptotic upper bound O(n() (3)* |
| Consider a function f(n) that is non-negative for all inters n>=0. We say that “f(n) is big oh g(n)” which we write f(n) = O(g(n)), if there exists an inter n0 and a constant c> 0 so that for all integers n>=n0, f(n) <= c g(n). √√√ | |

|  |  |
| --- | --- |
| 1. Ontleed die volgende programdeel met O(n) (5) | Analyze the following program segment with O(n) (5) |
| public class Question1.3  {  public static int numbers (int n)   1. { 2. int prod = 1; 3. for (int i=1; i<n; i++ ) 4. { 5. for ( int j=0; j<i; ++j) 6. prod \*=j; 7. } 8. return prod; 9. } 10. } | |
| 15 O(1) | 18a O(n) |
| *16a O(1)* | *18b O(n2)* |
| *16b O(n)* | *18c O(n2)* |
| 16c O(n) | 19 *O(n2)* |
| 20 O(n) | TOTAAL: *O(n2)* |