ITRW222
Datastrukture / *Data structures*
Klastoets 2 / *Class test 2*

Tydsduur: 30 Min
Duration : 30 Min ***01/08/2017***

NAAM/*NAME*:_____MEMO_____

SUDENTE NR /*STUDENT NR:*_____

Vraag 1 / *Question 1* **√= 1/2 mark**

Gebruik tau -notasie om die volgende programlyne te analiseer.
Use the tau-notation to analyse the following program segment.

Kode / *Code*	**Tyd / *Time***
int a =3;	t_{fetch} √+ t_{store} √
for (int i=1; i<=n; i++)	a. t_{fetch} √+ t_{store} √
	b. ($2t_{fetch}$ √+ $t_{<}$ √)(n+1) √
	c. ($2t_{fetch}$ √+ t_{+} √+ t_{store} √)(n) √
b=arr[i]; (binne die lus / *inside the loop*)	$3t_{fetch}$ √√+ $t_{[.]}$ √+ t_{store} √)(n) √

(8)

Vraag 2 / *Question 2*
Bestudeer die volgende program en voltooi dan die tabel.
Study the following table and complete the table. (8)

Study the following and complete the table.

```
1  public class Example
2  {
3        public static int falsenacci  (int  n)
4        {
5              int previous  =  -1;
6              int result  =  1;
7              for  (int  i  =  0;  i <= n;  ++ i)
8              {
9                    for (j = 1; j <= i; j++)
10                   {
11                       result  =  sum+4;
12                   }
13             }
14             return result;
15       }
16 }
```

YOU DO NOT HAVE TO USE THE FORMULA TO SIMPLIFY YOUR ANWER – KEEP IT IN SUMMATION FORMAT

Reël nommer/ *Line number*	Vereenvoudigde model / *Simplified model*
9a	$2(n+1)$ √√
9b	$3\sum_{i=0}^{n}(i+1)$ √√√
9c	$4\sum_{i=0}^{n}(i)$ √√√

Vraag3 / *Question 3*

Bewys die volgende formule: /*Proof the following formula:*

$$\sum_{i=1}^{n} i = \frac{n(n+1)}{2}$$

(4)

Start by expanding the left side

$$\sum_{i=1}^{n} i = 1+2+3+\ldots\ldots\ldots.+(n-2)+(n-1)+n$$ √

and

$$\sum_{i=1}^{n} i = n+(n-1)+(n-2)+\ldots\ldots+3+2+1$$ √

When you add these two rows together you get *n* pairs that each adds to *(n+1) thus*: √

$$2\sum_{i=1}^{n} i = n(n+1)$$ √

and

$$\sum_{i=1}^{n} i = \frac{n(n+1)}{2}$$