SU2 Assignment

Write the Tau-notation for the following code:

1.	if(weight==60) 2τfetch + τ<	**7.**	if(x*=z<60) 3τfetch + τstore + τx + τ<
2.	if(a<b++) 3τfetch + τstore + τ+ + τ<	**8.**	if(x[i]>z[c]) 6τfetch + 2τ[.] + τ<
3.	return --length; 3τfetch + τstore + τ- + τreturn	**9.**	x=getY(a[1]); 3τfetch + τ[.] + 2τstore + τcall + τgetY(a[1])
4.	a=b[--c]; 5τfetch + 2τstore + τ- + τ[.]	**10.**	sum=x[2]+z[0]; 6τfetch + 2τ[.] + τ+ + τstore
5.	if(x>=y[z]) 4τfetch + τ< + τ[.]	**11.**	ans = A + getB(C); 2τfetch + 2τstore + τ+ + τcall + τgetB(C)
6.	if(age-10==40) 3τfetch + τ- + τ<		

12. Now analyse questions 1 to 6 again using the simplified method.

a.	if(weight==60) 2τfetch + τ< 2(1) + 1 = 3	d.	a=b[--c]; 5τfetch + 2τstore + τ- + τ[.] 5(1) + 2(1) + 1 + 1 = 9
b.	if(a<b++) 3τfetch + τstore + τ+ + τ< 3(1) + 1 + 1 + 1 = 6	e.	if(x>=y[z]) 4τfetch + τ< + τ[.] 4(1) + 1 + 1 = 6
c.	return --length; 2τfetch + τstore + τ- + τreturn 2(1) + 1 + 1 + 1 = 5	f.	if(age-10==40) 3τfetch + τ- + τ< 3(1) + 1 + 1 = 5

Use the simplified model to analyse the following program segments. Remember to write your answers in the simplest form.

13.	for(int i = 0;i <= n; ++i) a = τfetch + τstore b = (n + 2)(2τfetch + τ<) c = (n + 1)(2τfetch + τstore + τ+) Simplified: 1 + 1 + (n+2)(2(1) + 1) + (n+1)(2(1) + 1 + 1)	**14.**	for(int i=0;i<=n+1;++i) a = τfetch + τstore b = (n + 3)(3τfetch + τ< + τ+) c = (n + 2)(2τfetch + τstore + τ+) Simplified: 1 + 1 + (n+3)(3(1) + 1 + 1) + (n+2)(2(1) + 1 + 1)
Total	7n + 12		9n + 25

15. Study the code below. Write down the simplified analysis of lines 6a, 6b, 6c and 8a, 8b and 8c on the next page.

```
1    public class Question
2    {
3       public static int numbers (int n)
4       {
5       int ans = 1;
6       for (int i=1;  i<=n;  i++ )
7         {
8              for ( int j=0;  j<=i+1; ++j)
9                ans +=i;
10          }
11        return ans;
12     }
13    }
```

6a.	τfetch + τstore Simplified: 1 + 1 = 2	8a.	(n)(τfetch + τstore) Simplified: (n)(1 + 1) = 2n
6b.	(n+1)(2τfetch + τ<) Simplified: (n+1)(2(1) + 1) = 3n + 3	8b.	(3τfetch + τ+ + τ<) x $\sum_{i=1}^{n}(i+3)$ Simplified: (3(1) + 1 + 1) x $\sum_{i=1}^{n}(i+3)$ = 5 $\sum_{i=1}^{n}(i+3)$
6c.	(n)(2τfetch + τstore + τ+) Simplified: (n)(2(1) + 1 + 1) = 4n	8c.	(2τfetch + τ+ + τstore) x $\sum_{i=1}^{n}(i+2)$ Simplified: (2(1) + 1 + 1) x $\sum_{i=1}^{n}(i+2)$ = 4 $\sum_{i=1}^{n}(i+2)$

16. Again, study the code in question 15. Write down the asymptotic analysis of lines 6a, 6b, 6c and 8a, 8b and 8c.

6a.	O(1)	8a.	O(1) x O(n) iterations = O(n)
6b.	O(1) x O(n) iterations = O(n)	8b.	O(1) x O(n^2) iterations = O(n^2)
6c.	O(1) x O(n) iterations = O(n)	8c.	O(1) x O(n^2) iterations = O(n^2)