

Examples of Analysis

Give the asymptotic running time of the following algorithms in Θ notation. Give your solution in the simplest terms possible. Show how you get the answer.

1. **function** func1(n)
 $s \leftarrow 0$;
 for $i \leftarrow n$ **to** n^2 **do**
 for $j \leftarrow n$ **to** i **do**
 $s \leftarrow s + j - i$;
 return(s);
2. **function** func2(n)
 $s \leftarrow 0$;
 for $i \leftarrow n$ **to** n^3 **do**
 $j \leftarrow 1$;
 while $j < i^2$ **do**
 $j \leftarrow j \times 2$;
 $s \leftarrow s + j - i$;
 return(s);
3. **function** func3(n)
 $s \leftarrow 0$;
 for $i \leftarrow n^2$ **to** $n^2 + n$ **do**
 for $j \leftarrow i$ **to** $i + 680$ **do**
 for $k \leftarrow 1$ **to** j **do**
 $s \leftarrow s + j - i + 2k$;
 return(s);
4. **function** func4(n)
 $s \leftarrow 0$;
 $i \leftarrow 1$;
 while $i < n^2$ **do**
 $j \leftarrow 1$;
 while $j < i^2$ **do**
 $j \leftarrow j + 1$;
 $s \leftarrow s + i - j$;
 $i \leftarrow i \times 2$;
 return(s);
5. **function** func5(n)
 $s \leftarrow 0$;
 for $i \leftarrow 1$ **to** $3n^2$ **do**
 for $j \leftarrow 1$ **to** $\lfloor 2n^3/i \rfloor$ **do**
 $s \leftarrow s + i - j$;
 return(s);