Aufgabenblatt 14 - Daniel Norman

The notation for Aufwand is as follows:

```
A-OPERATION
```

e.g. for addition

```
A-+
```

Aufgabe 1.3

bulding the polynom

```
A-exp(n) = A-=, A-==, A-even + A-odd +
            max(A-/ + A-exp(n/2) + A-*,
                A-- + A-/ + A-exp((n-1)/2) + 2*A-*)
A-exp(n) = 2*A-= + A-even + A-odd + A-- + A-/ + A-exp((n-1)/2) + 2*A-*
A-exp(n) = 2*const-equality + const-even + const-odd + const-subtraction + const-division
 + A-exp(x,(n-1)/2) + 2 * const-multiplication
A-exp(n) = const-all + A-exp((n-1)/2)
```

matching the variables

```
b = const
c = 1
k = 0
```

```
A-exp e O(log n)
```

Aufgabe 3.2

Best-case

bulding the polynom

```
A-qsort(n)
   = n*A-< + A-qsort(lesser) + A-++ + A-qsort(greaterEq)
   = n*const-< + const-++ + A-qsort(lesser) + A-qsort(greaterEq)
   = n*const-< + const-++ + 2A-qsort((n-1)/2)
   = n + const-all + 2A-qsort((n-1)/2)
```

NOTE A-qsort(lesser) + A-qsort(greaterEq) ~ 2A-qsort((n-1)/2)

matching variables

```
c = 2
b = 1
k = 1
```

matching polynom in the complexity table

```
O( n^k * log(n) ) = O( n log(n) )
```

Worst-case (when the list is already ordered)

bulding the polynom

```
A-qsort(n) = n*A-< + A-qsort(lesser) + A-++ + A-qsort(greaterEq)
           = n*const-< + const-++ + A-qsort(lesser) + A-qsort(greaterEq)
           = n*const-< + const-++ + A-qsort(n-1)
           = n + const-all + A-qsort(n-1)
```

NOTE: A-qsort(lesser) is empty and A-qsort(greaterEq) = A-qsort(n-1)

matching variables

```
c = 1
b = 1
k = 1
```

matching polynom in the complexity table

```
O( n^(k+1) ) = O( n^(2) )
```