

Seminar 7 - Ansamblu

1. Notiuni teoretice

ansamblu binar = vector de elemente TComparabil care poate fi vizualizat sub forma unui arbore binar si avand :

1. Structura de ansamblu : **arbore aproape plin, toate nivelurile exceptand ultimul care este completat de la stanga la dreapta**

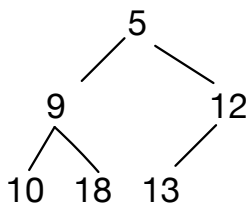
2. Proprietate de ansamblu

Ansamblu minimal, oricare e \leq descendenti

Ansamblu maximal, oricare e \geq descendenti

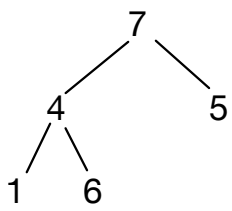
1	2	3	4	5	6
5	9	12	10	18	13

MIN-HEAP

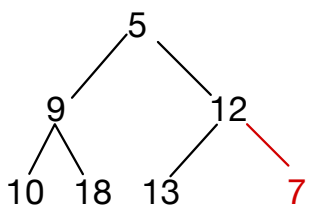


pt oricare pozitie i din vector :
fiu stanga $2i$ ($2i \leq n$)
fiu dreapta : $2i+1$ ($2i+1 \leq n$)
parinte $i/2$

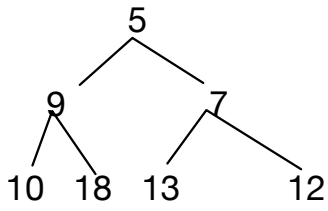
MAX-HEAP



Exercitiu

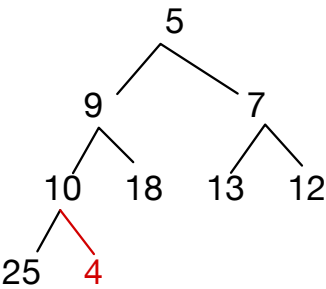


1	2	3	4	5	6	7
5	9	12	10	18	13	7



1	2	3	4	5	6	7
5	9	7	10	18	13	12

Adaugam 4

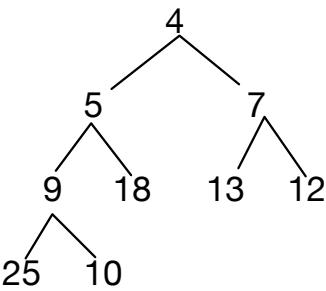


1	2	3	4	5	6	7	8	9
5	9	7	10	18	13	12	25	4
5	9	7		18	13	12	25	10
5		7	9	18	13	12	25	10
4	5	7	9	18	13	12	25	10

crt = 9
p = 9 / 2 = 4
4 nu este => 10

crt = 4
p = 4 / 2 = 2
4 nu este => 9

crt = 2
p = 2 / 2 = 1
4 nu este => 5



Coadă cu Prioritati

a : TElement[]
n : Intreg
capacitate : Intreg
rel : Relatie

subalgoritm adauga(cp, e):
 cp.n <- cp.n + 1
 cp.a[cp.n] <- e
 urca(cp.a, cp.n, cp.rel)
sf subalg.

subalgoritm urca(a, pos, rel)
 elem <- a[pos]
 crt <- pos
 parinte <- [pos/2]

```
cat timp(parinte >= 1 si !rel(elem, a[parinte])
  a[crt] <- a[parinte]
  crt <- parinte
  parinte <- [parinte/2]
sf cat timp
a[crt] <- elem
sf subalg
```

2. TAD COADA CU PRIORITATI BIDIRECTIONALA

```
->creeaza(cpb)      Theta(1)
->adauga(cpb, e)     O(log2n)
->sterge_min(cpb)    O(log2n)
->sterge_ax(cpb)     O(log2n)
->cauta_min(cpb)     Theta(1)
->cauta_max(cpb)     Theta(1)
```

folosim 2 ansambluri

MIN HEAP **a_min** : TElement[]
MAX HEAP **a_max** : TElement[]
 n : Intreg
 cap : Intreg
 pos_a_min : TElement[], unde pos_a_min[i] = poz pe care este retinut a_max[i] in a_min
 pos_a_max : TElement[], unde pos_a_max[i] = poz pe care este retinut a_min[i] in a_max

	1	2	3	4	5	6	7	8	9	10
a_min	10	18								
pos_a_max	2	1								

	1	2	3	4	5	6	7	8	9	10
a_min	18	10								
pos_a_max	2	1								