Seminar5 - B4

Thursday, 19 March 2020 07:58

// ghicim atribuirea

$\tau \to x[\,] = \underbrace{0 \ \_ \ \_ \ \_ \ \_ \ \_ \ \_}_{max}$

```
max = 0;
for(i=0; i<n; i++)
   for(j=0; j<3; j++)
      if(abs(v[i][j]) > max)
            max = abs(v[i][j]);
for(i=0; i<=max; i++)
      choose x[i] in {0,1};

// verific dacă am ghicit corect
if(isTrue(v, n, x) == true)
      print("success");   // DA
else print("failure");    // Nu Stiu
```

```
isTrue(v[][], n, x[])
{ for(i=0; i<n; i++)
  {  s=0;
     for(j=0; j<3; j++)
     {  if(v[i][j]>0)
           s=s+x[v[i][j]];
        else s=s+(1-x[abs(v[i][j])]);
     }
     if(s==0) return false;   // 3   true
  }
  return true;   // false
}
```

x: | i |
true

7b φ - 3DNF $\quad (x_1 \wedge \neg x_2 \wedge x_3) \vee (\_ \wedge \_ \wedge \_)$

INPUT: $v[n][3]$ - φ în 3DNF, n - nr. de conjuncții

OUTPUT: DA - dacă φ este validă
NU - altfel.

```
// ghicim atribuirea care face formula falsă
----- // calcul max. din v
for(i=0; i<n; i++)
     choose x[i] in {0,1};
// verif.
if(isTrueDNF(v, n, x) == false)
     print("failure");   // NU
else print("success");   // Nu Stiu
```

8 X_i - alg. se oprește după i iterații
(timpul de execuție este i)

$P(X_1) = np \cdot (n-1)! \cdot \frac{1}{n!}$ $\qquad np = \lfloor \frac{n}{2} \rfloor (+1)$

$p \ \underline{\quad n-1 \quad}$ $\qquad$ $n = 4$: 0 2 $\qquad$ 5: 0 2 4

$np \cdot (n-1)!$ $\qquad ni = n - np$

$P(X_2) = ni \cdot np \cdot (n-2)! \cdot \frac{1}{n!}$

$i\,p \ \underline{\quad n-2 \quad}$

$P(X_3) = A_{ni}^{2} \cdot np \cdot (n-3)! \cdot \frac{1}{n!}$

$i\,i\,p \ \underline{\quad n-3 \quad}$

$P(X_k) = A_{ni}^{k-1} \cdot np \cdot (n-k)! \cdot \frac{1}{n!}$

$\vdots$

$P(X_{ni+1})$

$$\mathbb{E}(T(n)) = \sum_{k=1}^{ni+1} k \cdot P(X_k) = \sum_{k=1}^{ni+1} k \cdot A_{ni}^{k-1} \cdot np \cdot (n-k)! \cdot \frac{1}{n!}$$

9 $a_0 a_1 a_2 \dots a_{n-1}$

2 3 1 4 5

X_i = "programul execută bucla interioară (v[i] > max) la pasul i" $\to$ 0 / 1

for(i=0; i<n; i++)

$$T(n) = 2 + \sum_{i=0}^{n-1} X_i \cdot (1+n)$$

$P(X_i) = (n-2)! \cdot \frac{n(n-1)}{2} \ \dots ???$

$\underbrace{i-1}_{<x,\ 1 \dots x-1} \ \boxed{x}_{i} \ \underbrace{n-i-1}$ $\qquad A_{x-1}^{i-1} \cdot P_{n-i-1}$ $\qquad A_{n-i-1}^{n-i-1}$ | nr de perm. convenabile pt un x

$$P(X_i) = \left(\sum_{x=i}^{n} A_{x-1}^{i-1} \cdot P_{n-i-1} \right) \cdot \frac{1}{n!} \qquad i \le x \le n \,!$$

nr. de perm.

$$\mathbb{E}(T(n)) = 2 + \sum_{i=0}^{n-1} \mathbb{E}(X_i) \cdot (1+n) = 2 + \sum_{i=0}^{n-1} P(X_i) \cdot (1+n)$$

$$\mathbb{E}(T(n)) = \mathbb{E}\left(2 + \sum_{i=0}^{n-1} X_i \cdot (1+n)\right).$$

$\mathbb{E}(A \cdot B) = \mathbb{E}(A) \cdot \mathbb{E}(B)$

$\mathbb{E}(A+B) = \mathbb{E}(A) + \mathbb{E}(B)$

10 $\quad \underline{\quad \boxed{\ }_{i} \quad \boxed{\ }_{j} \quad}$

$v[i] > v[j] \to$ bucla int.

$$T(n) = 2 + \sum_{i=0}^{n-2} \sum_{j=i+1}^{n-1} \underbrace{X_{ij}}_{0/1} \, n$$

5 3 (i, j)

X_{ij} = " $v[i] > v[j]$ "

$$P(X_{ij}) = \underbrace{C_n^2}_{v[i],\, v[j]} \cdot (n-2)! \cdot \frac{1}{n!}$$

$\underline{i-1} \ \underline{j-i-1} \ \underline{n-j-1}$

$$\mathbb{E}(T(n)) = 2 + \sum_{i=0}^{n-2} \sum_{j=i+1}^{n-1} \mathbb{E}(X_{ij}) \cdot n = 2 + \sum_{i=0}^{n-2} \sum_{j=i+1}^{n-1} P(X_{ij}) \cdot n$$