Program Studi Teknik Informatika

Sekolah Teknik Elektro dan Informatika

Institut Teknologi Bandung

Solusi Ujian Akhir Semester IF2211 Strategi Algoritma

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Waktu: 150 menit

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**Bagian C (Pattern Matching dan Teori P dan NP)**

1. **(Nilai 25)**
2. Sebuah string biner sepanjang 100 bit semuanya terdiri dari bit 0. Hitung jumlah perbandingan karakter pada pencocokan *pattern* dengan algoritma *Brute Force* jika *pattern* adalah (i) 0001 dan (ii) 1000.
3. Pertanyaan yang sama dengan (a) jika algoritma yang digunakan adalah Boyer-Moore
4. Diberikan teks “HERE IS A SIMPLE EXAMPLE” dan pola “EXAMPLE”. Gambarkan proses pencocokan pola dengan teks sampai ketemu dengan algoritma KMP dan Boyer-Moore. Hitung jumlah perbandingan karakter yang terjadi. Dalam menjawab soal ini, hitung fungsi pinggiran dan fungsi *last occurence*.

Teks:

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| H | E | R | E |  | I | S |  | A |  | S | I | M | P | L | E |  | E | X | A | M | P | L | E |

 Pola:

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| E | X | A | M | P | L | E |

Jawaban:

1. Pattern 0001: Jumlah perbandingan = 4(100 – 4 + 1) = 4 x 97 = 388

Pattern 1000: Jumlah perbandingan = 1 x (100 - 4 + 1) 97

1. Pattern 0001: Jumlah perbandingan = 97 x 1 = 97

Pattern 1000: Jumlah perbandingan = 97 x 4 = 388

1. KMP:

Fungsi pinggiran:

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| j | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| P[j] | E | X | A | M | P | L | E |
| k | - | 0 | 1 | 2 | 3 | 4 | 5 |
| b(k) | - | 0 | 0 | 0 | 0 | 0 | 0 |

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 21 22 23 24 25 26 27

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 Sebanyak 27 perbandingan

 Boyer-Moore:

Fungsi last occurance:

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| x | A | E | L | M | P | X | Lainnya |
| L[x] | 2 | 6 | 5 | 3 | 4 | 1 | -1 |

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 Sebanyak 15 perbandingan

1. **(Nilai 10)** Diberikan beberapa buah pernyataan di bawah ini tentang *P*, *NP*, dan *NP-complete*. Tentukan pernyataan mana saja yang benar (sebutkan nomornya saja).
2. *P* Problem adalah himpunan semua persoalan apapun dengan kompleksitas waktu

 polinomial

1. *NP* adalah singkatan dari Non-Polynomial
2. Persoalan di dalam kelas *NP* memiliki waktu polinomial pada tahap verifikasi suatu

 solusi.

1. Sebuah persoalan *X* dikatakan *NP-complete* jika *X* termasuk ke dalam kelas *NP* dan *X* dapat direduksi menjadi persoalan di dalam *NP* lainnya dalam waktu polinomial.
2. Jika *A* adalah sebuah persoalan di dalam *NP-complete* dan *B* adalah persoalan *NP* tapi tidak perlu *NP-complete*, maka jika *A* dapat diselesaikan dalam waktu polinomial maka implikasinya *P* = *NP*.

Jawaban:

1. Salah, tidak untuk semua persoalan, tetapi hanya persoalan keputusan
2. Salah, seharusnya NP = non-deterministic polynomial
3. Benar
4. Salah, sehausnya semua persoa di dalam NP dapat direduksi menjadi X dalam waktu polynomial
5. Benar
6. **(Nilai 2)** Apa perkiraan nilai anda untuk mata kuliah ini? (A/AB/B/BC/C/D/E)