

**IF2211 Strategi Algoritma
(Semester II Tahun Ajaran 2019/2020)**

Bobot SKS : 3

Dosen : Dr. Masayu Leylia Khodra (K1)
Dr. Nur Ulfa Maulidevi, S.T, M.Sc. (K2)
Dr. Ir. Rinaldi Munir, M.T. (K3)

E-mail : masayu@informatika.org
ulfa@informatika.org
rinaldi@informatika.org

URL kuliah : <http://informatika.stei.itb.ac.id/~rinaldi.munir>

Asisten : (belum ditentukan)

Jadwal kuliah : Senin, 13.00 – 13.50
Rabu, 13.00 – 14.40

Tujuan Umum Kuliah:

Mahasiswa memahami beberapa strategi yang digunakan dalam memecahkan persoalan secara mangkus sesuai dengan karakteristik persoalan tersebut.

Tujuan Khusus:

Mahasiswa mampu:

1. Memilih strategi yang tepat untuk menyelesaikan suatu persoalan.
2. Membuat program untuk menyelesaikan persoalan dengan strategi yang tepat.

Capaian Kuliah (Student Outcome) berdasarkan ABET

1. *Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.*
2. *Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.*
3. *Communicate effectively in a variety of professional contexts.*
4. *Apply computer science theory and software development fundamentals to produce computing-based solutions.*

Prasyarat Kuliah:

1. IF2120 Matematika Diskrit
2. IF2110 Algoritma dan Struktur Data

Lingkup Bahasan:

1. Pengantar Strategi Algoritma
2. Review kompleksitas algoritma
3. Algoritma *brute force*
4. Algoritma *greedy*
5. Algoritma *divide and conquer*
6. Algoritma *decrease and conquer*
6. *DFS* dan *BFS*
7. Algoritma *backtracking*
8. Algoritma *branch and bound*
9. Tambahan: Algoritma *A**, *Best First Search*, dan *UCS*
10. Program dinamis (*dynamic programming*)
11. *String matching* + *regular expression (Regex)*
12. Teori P, NP, dan NP-Completes

Referensi kuliah:

1. Anany Levitin, *Introduction to the Design & Analysis of Algorithms*, Addison-Wesley, 2003.
2. Bhardwaj, Anuj; Verma, Parag, *Design and Analysis of Algorithm*, Alpha Science International Ltd., 2017, can be accessed at: <http://portal.igpublish.com/iglibrary/obj/APSB0000252?dtbs=&searchid=1573133164973plapRvm7MQJMAwkcwThUs> from <https://lib.itb.ac.id/>
3. Khan Academy, *Computer Science: Algorithm*, can be accessed at <https://www.khanacademy.org/computing/computer-science/algorithms>
4. Coursera, *Data Structures and Algorithms Specialization*, 2019, can be accessed at: <https://www.coursera.org/learn/algorithmic-toolbox?specialization=data-structures-algorithms>
5. Stuart J Russell & Peter Norvig, *Resources of topics in Artificial Intelligence: A Modern Approach*, 3rd Edition, Global Edition Paperback, Pearson, 2016, <http://aima.cs.berkeley.edu/>

6. Brandons Kerritt, *All You Need to Know About Big O Notation* [Python Examples], 2019, can be accessed at <https://dev.to/brandonskerritt/all-you-need-to-know-about-big-o-notation-python-examples-2k4o>
7. Coursera, *Machine Learning Clustering and Retrieval: Complexity of Brute Force Algorithm*, 2019, can be accessed at <https://www.coursera.org/lecture/ml-clustering-and-retrieval/complexity-of-brute-force-search-5R6q3>
8. Rinaldi Munir, Diktat kuliah IF2251 Strategi Algoritmik, Teknik Informatika ITB
9. Marin Vlastelica Pogančić, *The Branch and Bound Algorithm*, 2019, can be accessed at <https://towardsdatascience.com/the-branch-and-bound-algorithm-a7ae4d227a69>
10. Jurafsky and James H. Martin, *Speech and Language Processing*, 2019, can be accessed at <https://web.stanford.edu/~jurafsky/slp3/>
11. Chua Hock-Chuan, *Regular Expressions (Regex)*, 2018, can be accessed at <https://www.ntu.edu.sg/home/ehchua/programming/howto/Regexe.html>
12. Ellis Horowitz & Sartaj Sahni, *Computer Algorithms*, Computer Science Press, 1998.
13. Richard E. Neapolitan, *Foundations of Algorithms*, D.C. Heath and Company, 1996
14. Thomas H. Cormen, *Introduction to Algorithms*, The MIT Press, 1992.

Penilaian :

- | | |
|--------------------------------|----------|
| 1. Ujian Tengah Semester (UTS) | – 1 kali |
| 2. Ujian Akhir Semester (UAS) | – 1 kali |
| 3. Tugas Besar (Tubes) | – 3 buah |
| 4. Tugas Kecil (Tucil) | – 3 buah |
| 4. Makalah (di akhir semester) | – 1 buah |
| 5. Kehadiran | |

Lain-lain :

Tugas pemrograman adalah tugas besar berkelompok. Program dikembangkan dengan menggunakan kaskas pemrograman berbasis *GUI* (*Graphical User Interface*). Tugas pertama direncanakan menggunakan kaskas pemrograman dengan GUI menggunakan bahasa C++ (misalnya *Visual C++*). Tugas kedua menggunakan C# dengan kaskas Visual Studio

atau yang sejenis, dan tugas ketiga menggunakan Java (*NetBeans, Eclipse*) + PHP. Tugas Kecil adalah tugas perorangan atau per-dua orangan dengan bahasa pemrograman yang ditentukan (C, C++, Java, Python).