



Bölüm 6: Dinamik Programlama

Algoritmalar



Dinamik Programlama

- Bazen karmaşık problemleri çözmek için akıllı yöntemlere ihtiyaç olur.
- Dinamik programlama bu akıllı yöntemlerden biridir.
- Büyük problemleri küçük, kolay çözülebilir parçalara bölerek
 - adım adım çözmeyi sağlar.





Dinamik Programlama

- Karmaşık problemleri küçük, tekrarlayan alt problemlere bölerek çözer.
- Bu yöntem, alt problemleri çözerek oluşturulan bir tablo kullanır.
- Aynı alt problem ile tekrar karşılaşıldığında,
 - tablodan bakılarak çözüm bulunur,
 - böylece zaman kazanılır.
- Optimizasyon problemlerinde sıklıkla kullanılır.



Dinamik Programlama Uygulamaları

- En kısa yol bulma: GPS cihazları, haritalar
- Dizi elemanlarının bir sıraya göre dizilmesi: Bilgisayar programları
- RNA dizilerinin yapısal özelliklerinin belirlenmesi: Biyoinformatik
- Yapay zeka uygulamaları: Satranç oynayan bilgisayarlar, makine çevirisi



Longest Increasing Subsequence

0, 8, 4, 12, 2, 10, 6, 14, 1, 9, 5, 13, 3, 11, 7, 15



Longest Increasing Subsequence

0, 8, 4, 12, 2, 10, 6, 14, 1, 9, 5, 13, 3, 11, 7, 15

0



Longest Increasing Subsequence

0, 8, 4, 12, 2, 10, 6, 14, 1, 9, 5, 13, 3, 11, 7, 15

0



Longest Increasing Subsequence

0, 8, 4, 12, 2, 10, 6, 14, 1, 9, 5, 13, 3, 11, 7, 15

0

0, 8



Longest Increasing Subsequence

0, 8, 4, 12, 2, 10, 6, 14, 1, 9, 5, 13, 3, 11, 7, 15

0

0, 8



Longest Increasing Subsequence

0, 8, 4, 12, 2, 10, 6, 14, 1, 9, 5, 13, 3, 11, 7, 15

0

0, 4

~~0, 8~~ Inactive



Longest Increasing Subsequence

0, 8, 4, 12, 2, 10, 6, 14, 1, 9, 5, 13, 3, 11, 7, 15

0

0, 4



Longest Increasing Subsequence

0, 8, 4, 12, 2, 10, 6, 14, 1, 9, 5, 13, 3, 11, 7, 15

0

0, 4

0, 4, 12



Longest Increasing Subsequence

0, 8, 4, 12, 2, 10, 6, 14, 1, 9, 5, 13, 3, 11, 7, 15

0

0, 4

0, 4, 12



Longest Increasing Subsequence

0, 8, 4, 12, 2, 10, 6, 14, 1, 9, 5, 13, 3, 11, 7, 15

0

0, 2

~~0, 4~~ Inactive

0, 4, 12



Longest Increasing Subsequence

0, 8, 4, 12, 2, 10, 6, 14, 1, 9, 5, 13, 3, 11, 7, 15

0

0, 2

0, 4, 12



Longest Increasing Subsequence

0, 8, 4, 12, 2, 10, 6, 14, 1, 9, 5, 13, 3, 11, 7, 15

0

0, 2

0, 2, 10

~~0, 4, 12~~ Inactive



Longest Increasing Subsequence

0, 8, 4, 12, 2, 10, 6, 14, 1, 9, 5, 13, 3, 11, 7, 15

0

0, 2

0, 2, 10



Longest Increasing Subsequence

0, 8, 4, 12, 2, 10, 6, 14, 1, 9, 5, 13, 3, 11, 7, 15

0

0, 2

0, 2, 6

~~0, 2, 10~~ Inactive



Longest Increasing Subsequence

0, 8, 4, 12, 2, 10, 6, 14, 1, 9, 5, 13, 3, 11, 7, 15

0

0, 2

0, 2, 6



Longest Increasing Subsequence

0, 8, 4, 12, 2, 10, 6, 14, 1, 9, 5, 13, 3, 11, 7, 15

0

0, 2

0, 2, 6

0, 2, 6, 14



Longest Increasing Subsequence

0, 8, 4, 12, 2, 10, 6, 14, 1, 9, 5, 13, 3, 11, 7, 15

0

0, 2

0, 2, 6

0, 2, 6, 14



Longest Increasing Subsequence

0, 8, 4, 12, 2, 10, 6, 14, 1, 9, 5, 13, 3, 11, 7, 15

0

0, 1

~~0, 2~~ Inactive

0, 2, 6

0, 2, 6, 14



Longest Increasing Subsequence

0, 8, 4, 12, 2, 10, 6, 14, 1, 9, 5, 13, 3, 11, 7, 15

0

0, 1

0, 2, 6

0, 2, 6, 14



Longest Increasing Subsequence

0, 8, 4, 12, 2, 10, 6, 14, 1, 9, 5, 13, 3, 11, 7, 15

0

0, 1

0, 2, 6

0, 2, 6, 9

~~0, 2, 6, 14~~ Inactive



Longest Increasing Subsequence

0, 8, 4, 12, 2, 10, 6, 14, 1, 9, 5, 13, 3, 11, 7, 15

0

0, 1

0, 2, 6

0, 2, 6, 9



Longest Increasing Subsequence

0, 8, 4, 12, 2, 10, 6, 14, 1, 9, 5, 13, 3, 11, 7, 15

0

0, 1

0, 2, 5

~~0, 2, 6~~ Inactive

0, 2, 6, 9



Longest Increasing Subsequence

0, 8, 4, 12, 2, 10, 6, 14, 1, 9, 5, 13, 3, 11, 7, 15

0

0, 1

0, 2, 5

0, 2, 6, 9



Longest Increasing Subsequence

0, 8, 4, 12, 2, 10, 6, 14, 1, 9, 5, 13, 3, 11, 7, 15

0

0, 1

0, 2, 5

0, 2, 6, 9

0, 2, 6, 9, 13



Longest Increasing Subsequence

0, 8, 4, 12, 2, 10, 6, 14, 1, 9, 5, 13, 3, 11, 7, 15

0

0, 1

0, 2, 5

0, 2, 6, 9

0, 2, 6, 9, 13



Longest Increasing Subsequence

0, 8, 4, 12, 2, 10, 6, 14, 1, 9, 5, 13, 3, 11, 7, 15

0

0, 1

0, 1, 3

~~0, 2, 5~~ Inactive

0, 2, 6, 9

0, 2, 6, 9, 13



Longest Increasing Subsequence

0, 8, 4, 12, 2, 10, 6, 14, 1, 9, 5, 13, 3, 11, 7, 15

0

0, 1

0, 1, 3

0, 2, 6, 9

0, 2, 6, 9, 13



Longest Increasing Subsequence

0, 8, 4, 12, 2, 10, 6, 14, 1, 9, 5, 13, 3, 11, 7, 15

0

0, 1

0, 1, 3

0, 2, 6, 9

0, 2, 6, 9, 11

~~0, 2, 6, 9, 13~~ Inactive



Longest Increasing Subsequence

0, 8, 4, 12, 2, 10, 6, 14, 1, 9, 5, 13, 3, 11, 7, 15

0

0, 1

0, 1, 3

0, 2, 6, 9

0, 2, 6, 9, 11



Longest Increasing Subsequence

0, 8, 4, 12, 2, 10, 6, 14, 1, 9, 5, 13, 3, 11, 7, 15

0

0, 1

0, 1, 3

0, 1, 3, 7

~~0, 2, 6, 9~~ Inactive

0, 2, 6, 9, 11



Longest Increasing Subsequence

0, 8, 4, 12, 2, 10, 6, 14, 1, 9, 5, 13, 3, 11, 7, 15

0

0, 1

0, 1, 3

0, 1, 3, 7

0, 2, 6, 9, 11



Longest Increasing Subsequence

0, 8, 4, 12, 2, 10, 6, 14, 1, 9, 5, 13, 3, 11, 7, 15

0

0, 1

0, 1, 3

0, 1, 3, 7

0, 2, 6, 9, 11

0, 2, 6, 9, 11, 15



Longest Increasing Subsequence

0, 8, 4, 12, 2, 10, 6, 14, 1, 9, 5, 13, 3, 11, 7, 15

0

0, 1

0, 1, 3

0, 1, 3, 7

0, 2, 6, 9, 11

0, 2, 6, 9, 11, 15



Longest Increasing Subsequence

0, 8, 4, 12, 2, 10, 6, 14, 1, 9, 5, 13, 3, 11, 7, 15

0

0, 1

0, 1, 3

0, 1, 3, 7

0, 2, 6, 9, 11

0, 2, 6, 9, 11, 15 Longest Increasing subseq



SON