

# Insertion Sort

$n = 6$

Sıralanacak Dizi: 7, 3, 5, 8, 2, 9

Başlangıç Durumu: 7 | 3, 5, 8, 2, 9

$i = 1$   $arr[i] = 3$   $j = 0$   $arr[j] = 7$   
 $arr[j+1] = arr[j]$

$(arr[i] = arr[0] \Rightarrow 7, 3 \times 3, 7), i++$

$i = 2$   $arr[2] = 5$   $j = 1$   $arr[j] = 7$

$arr[j+1] = arr[j]$

$(arr[2] = arr[1] \Rightarrow 7, 5 \times 5, 7), i++$

$i = 3$   $arr[3] = 8$   $j = 2$   $arr[j] = 7$   $7 < 8$

$arr[j+1] = number$

$(arr[3] = 8 \Rightarrow 7, 8), i++$

$i = 4$   $arr[4] = 2$   $j = 3$   $arr[j] = 8$   $8 > 2$

$arr[j+1] = arr[j]$

$(arr[4] = arr[3] \Rightarrow 7, 2, 8)$

$i = 5$   $arr[5] = 9$   $j = 4$   $arr[j] = 2$   $2 < 9$

$arr[j+1] = number$

$(arr[5] = 9 \Rightarrow 7, 2, 8, 9), i++$

$i = 6$   $arr[6] = 7$   $j = 5$   $arr[j] = 9$   $9 < 7$

$arr[j+1] = arr[j]$

$(arr[6] = arr[5] \Rightarrow 7, 9, 2, 8, 9), i++$

$i = 7$   $arr[7] = 3$   $j = 6$   $arr[j] = 7$   $7 < 3$

$arr[j+1] = arr[j]$

$(arr[7] = arr[6] \Rightarrow 7, 3, 9, 2, 8, 9), i++$

$i = 8$   $arr[8] = 5$   $j = 7$   $arr[j] = 3$   $3 < 5$

$arr[j+1] = number$

$(arr[8] = 5 \Rightarrow 7, 3, 5, 9, 2, 8, 9), i++$

$i = 9$   $arr[9] = 8$   $j = 8$   $arr[j] = 5$   $5 < 8$

$arr[j+1] = number$

$(arr[9] = 8 \Rightarrow 7, 3, 5, 8, 9, 2, 8, 9), i++$

$i = 10$   $arr[10] = 2$   $j = 9$   $arr[j] = 8$   $8 > 2$

$arr[j+1] = arr[j]$

$(arr[10] = arr[9] \Rightarrow 7, 2, 8, 9, 3, 5, 8, 9), i++$

$i = 11$   $arr[11] = 9$   $j = 10$   $arr[j] = 2$   $2 < 9$

$arr[j+1] = number$

$(arr[11] = 9 \Rightarrow 7, 2, 8, 9, 3, 5, 8, 9, 9), i++$

$i = 12$   $arr[12] = 7$   $j = 11$   $arr[j] = 9$   $9 < 7$

$arr[j+1] = arr[j]$

$(arr[12] = arr[11] \Rightarrow 7, 9, 2, 8, 9, 3, 5, 8, 9, 9), i++$

$i = 13$   $arr[13] = 5$   $j = 12$   $arr[j] = 7$   $7 < 5$

$arr[j+1] = arr[j]$

$(arr[13] = arr[12] \Rightarrow 7, 5, 9, 2, 8, 9, 3, 5, 8, 9, 9), i++$

$i = 14$   $arr[14] = 8$   $j = 13$   $arr[j] = 5$   $5 < 8$

$arr[j+1] = number$

$(arr[14] = 8 \Rightarrow 7, 5, 8, 9, 2, 8, 9, 3, 5, 8, 9, 9), i++$

$i = 15$   $arr[15] = 2$   $j = 14$   $arr[j] = 8$   $8 > 2$

$arr[j+1] = arr[j]$

$(arr[15] = arr[14] \Rightarrow 7, 2, 8, 9, 3, 5, 8, 9, 9, 2, 8, 9, 9), i++$

$i = 16$   $arr[16] = 9$   $j = 15$   $arr[j] = 2$   $2 < 9$

$arr[j+1] = number$

$(arr[16] = 9 \Rightarrow 7, 2, 8, 9, 3, 5, 8, 9, 9, 2, 8, 9, 9, 9), i++$

$i = 17$   $arr[17] = 7$   $j = 16$   $arr[j] = 9$   $9 < 7$

$arr[j+1] = arr[j]$

$(arr[17] = arr[16] \Rightarrow 7, 9, 2, 8, 9, 3, 5, 8, 9, 9, 2, 8, 9, 9, 9), i++$

$i = 18$   $arr[18] = 5$   $j = 17$   $arr[j] = 7$   $7 < 5$

$arr[j+1] = arr[j]$

$(arr[18] = arr[17] \Rightarrow 7, 5, 9, 2, 8, 9, 3, 5, 8, 9, 9, 2, 8, 9, 9, 9), i++$

$i = 19$   $arr[19] = 8$   $j = 18$   $arr[j] = 5$   $5 < 8$

$arr[j+1] = number$

$(arr[19] = 8 \Rightarrow 7, 5, 8, 9, 2, 8, 9, 3, 5, 8, 9, 9, 2, 8, 9, 9, 9), i++$

$i = 20$   $arr[20] = 2$   $j = 19$   $arr[j] = 8$   $8 > 2$

$arr[j+1] = arr[j]$

$(arr[20] = arr[19] \Rightarrow 7, 2, 8, 9, 3, 5, 8, 9, 9, 2, 8, 9, 9, 2, 8, 9, 9, 9), i++$

$i = 21$   $arr[21] = 9$   $j = 20$   $arr[j] = 2$   $2 < 9$

$arr[j+1] = number$

$(arr[21] = 9 \Rightarrow 7, 2, 8, 9, 3, 5, 8, 9, 9, 2, 8, 9, 9, 2, 8, 9, 9, 9, 9), i++$

$i = 22$   $arr[22] = 7$   $j = 21$   $arr[j] = 9$   $9 < 7$

$arr[j+1] = arr[j]$

$(arr[22] = arr[21] \Rightarrow 7, 9, 2, 8, 9, 3, 5, 8, 9, 9, 2, 8, 9, 9, 2, 8, 9, 9, 9, 9), i++$

$i = 23$   $arr[23] = 5$   $j = 22$   $arr[j] = 7$   $7 < 5$

$arr[j+1] = arr[j]$

$(arr[23] = arr[22] \Rightarrow 7, 5, 9, 2, 8, 9, 3, 5, 8, 9, 9, 2, 8, 9, 9, 2, 8, 9, 9, 9, 9), i++$

$i = 24$   $arr[24] = 8$   $j = 23$   $arr[j] = 5$   $5 < 8$

$arr[j+1] = number$

$(arr[24] = 8 \Rightarrow 7, 5, 8, 9, 2, 8, 9, 3, 5, 8, 9, 9, 2, 8, 9, 9, 2, 8, 9, 9, 9, 9), i++$

$i = 25$   $arr[25] = 2$   $j = 24$   $arr[j] = 8$   $8 > 2$

$arr[j+1] = arr[j]$

$(arr[25] = arr[24] \Rightarrow 7, 2, 8, 9, 3, 5, 8, 9, 9, 2, 8, 9, 9, 2, 8, 9, 9, 2, 8, 9, 9, 9, 9), i++$

$i = 26$   $arr[26] = 9$   $j = 25$   $arr[j] = 2$   $2 < 9$

$arr[j+1] = number$

$(arr[26] = 9 \Rightarrow 7, 2, 8, 9, 3, 5, 8, 9, 9, 2, 8, 9, 9, 2, 8, 9, 9, 2, 8, 9, 9, 9, 9, 9), i++$

$i = 27$   $arr[27] = 7$   $j = 26$   $arr[j] = 9$   $9 < 7$

$arr[j+1] = arr[j]$

$(arr[27] = arr[26] \Rightarrow 7, 9, 2, 8, 9, 3, 5, 8, 9, 9, 2, 8, 9, 9, 2, 8, 9, 9, 2, 8, 9, 9, 9, 9, 9), i++$

$i = 28$   $arr[28] = 5$   $j = 27$   $arr[j] = 7$   $7 < 5$

$arr[j+1] = arr[j]$

$(arr[28] = arr[27] \Rightarrow 7, 5, 9, 2, 8, 9, 3, 5, 8, 9, 9, 2, 8, 9, 9, 2, 8, 9, 9, 2, 8, 9, 9, 9, 9, 9), i++$

$i = 29$   $arr[29] = 8$   $j = 28$   $arr[j] = 5$   $5 < 8$

$arr[j+1] = number$

$(arr[29] = 8 \Rightarrow 7, 5, 8, 9, 2, 8, 9, 3, 5, 8, 9, 9, 2, 8, 9, 9, 2, 8, 9, 9, 2, 8, 9, 9, 9, 9, 9), i++$

$i = 30$   $arr[30] = 2$   $j = 29$   $arr[j] = 8$   $8 > 2$

$arr[j+1] = arr[j]$

$(arr[30] = arr[29] \Rightarrow 7, 2, 8, 9, 3, 5, 8, 9, 9, 2, 8, 9, 9, 2, 8, 9, 9, 2, 8, 9, 9, 2, 8, 9, 9, 9, 9, 9, 9), i++$

$i = 31$   $arr[31] = 9$   $j = 30$   $arr[j] = 2$   $2 < 9$

$arr[j+1] = number$

$(arr[31] = 9 \Rightarrow 7, 2, 8, 9, 3, 5, 8, 9, 9, 2, 8, 9, 9, 2, 8, 9, 9, 2, 8, 9, 9, 2, 8, 9, 9, 9, 9, 9, 9, 9), i++$

$i = 32$   $arr[32] = 7$   $j = 31$   $arr[j] = 9$   $9 < 7$

$arr[j+1] = arr[j]$

$(arr[32] = arr[31] \Rightarrow 7, 9, 2, 8, 9, 3, 5, 8, 9, 9, 2, 8, 9, 9, 2, 8, 9, 9, 2, 8, 9, 9, 2, 8, 9, 9, 9, 9, 9, 9, 9), i++$

$i = 33$   $arr[33] = 5$   $j = 32$   $arr[j] = 7$   $7 < 5$

$arr[j+1] = arr[j]$

$(arr[33] = arr[32] \Rightarrow 7, 5, 9, 2, 8, 9, 3, 5, 8, 9, 9, 2, 8, 9, 9, 2, 8, 9, 9, 2, 8, 9, 9, 9, 9, 9, 9, 9, 9), i++$

$i = 34$   $arr[34] = 8$   $j = 33$   $arr[j] = 5$   $5 < 8$

$arr[j+1] = number$

$(arr[34] = 8 \Rightarrow 7, 5, 8, 9, 2, 8, 9, 3, 5, 8, 9, 9, 2, 8, 9, 9, 2, 8, 9, 9, 2, 8, 9, 9, 9, 9, 9, 9, 9, 9), i++$

$i = 35$   $arr[35] = 2$   $j = 34$   $arr[j] = 8$   $8 > 2$

$arr[j+1] = arr[j]$

$(arr[35] = arr[34] \Rightarrow 7, 2, 8, 9, 3, 5, 8, 9, 9, 2, 8, 9, 9, 2, 8, 9, 9, 2, 8, 9, 9, 2, 8, 9, 9, 9, 9, 9, 9, 9, 9, 9), i++$

$i = 36$   $arr[36] = 9$   $j = 35$   $arr[j] = 2$   $2 < 9$

$arr[j+1] = number$

$(arr[36] = 9 \Rightarrow 7, 2, 8, 9, 3, 5, 8, 9, 9, 2, 8, 9, 9, 2, 8, 9, 9, 2, 8, 9, 9, 2, 8, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9), i++$

$i = 37$   $arr[37] = 7$   $j = 36$   $arr[j] = 9$   $9 < 7$

$arr[j+1] = arr[j]$

$(arr[37] = arr[36] \Rightarrow 7, 9, 2, 8, 9, 3, 5, 8, 9, 9, 2, 8, 9, 9, 2, 8, 9, 9, 2, 8, 9, 9, 2, 8, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9), i++$

$i = 38$   $arr[38] = 5$   $j = 37$   $arr[j] = 7$   $7 < 5$

$arr[j+1] = arr[j]$

$(arr[38] = arr[37] \Rightarrow 7, 5, 9, 2, 8, 9, 3, 5, 8, 9, 9, 2, 8, 9, 9, 2, 8, 9, 9, 2, 8, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9), i++$

$i = 39$   $arr[39] = 8$   $j = 38$   $arr[j] = 5$   $5 < 8$

$arr[j+1] = number$

$(arr[39] = 8 \Rightarrow 7, 5, 8, 9, 2, 8, 9, 3, 5, 8, 9, 9, 2, 8, 9, 9, 2, 8, 9, 9, 2, 8, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9), i++$

$i = 40$   $arr[40] = 2$   $j = 39$   $arr[j] = 8$   $8 > 2$

$arr[j+1] = arr[j]$

$(arr[40] = arr[39] \Rightarrow 7, 2, 8, 9, 3, 5, 8, 9, 9, 2, 8, 9, 9, 2, 8, 9, 9, 2, 8, 9, 9, 2, 8, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9), i++$

$i = 41$   $arr[41] = 9$   $j = 40$   $arr[j] = 2$   $2 < 9$

$arr[j+1] = number$

$(arr[41] = 9 \Rightarrow 7, 2, 8, 9, 3, 5, 8, 9, 9, 2, 8, 9, 9, 2, 8, 9, 9, 2, 8, 9, 9, 2, 8, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9), i++$

$i = 42$   $arr[42] = 7$   $j = 41$   $arr[j] = 9$   $9 < 7$

$arr[j+1] = arr[j]$

$(arr[42] = arr[41] \Rightarrow 7, 9, 2, 8, 9, 3, 5, 8, 9, 9, 2, 8, 9, 9, 2, 8, 9, 9, 2, 8, 9, 9, 2, 8, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9), i++$

$i = 43$   $arr[43] = 5$   $j = 42$   $arr[j] = 7$   $7 < 5$

$arr[j+1] = arr[j]$

$(arr[43] = arr[42] \Rightarrow 7, 5, 9, 2, 8, 9, 3, 5, 8, 9, 9, 2, 8, 9, 9, 2, 8, 9, 9, 2, 8, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9), i++$

$i = 44$   $arr[44] = 8$   $j = 43$   $arr[j] = 5$   $5 < 8$

$arr[j+1] = number$

$(arr[44] = 8 \Rightarrow 7, 5, 8, 9, 2, 8, 9, 3, 5, 8, 9, 9, 2, 8, 9, 9, 2, 8, 9, 9, 2, 8, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9), i++$

$i = 45$   $arr[45] = 2$   $j = 44$   $arr[j] = 8$   $8 > 2$

$arr[j+1] = arr[j]$

$(arr[45] = arr[44] \Rightarrow 7, 2, 8, 9, 3, 5, 8, 9, 9, 2, 8, 9, 9, 2, 8, 9, 9, 2, 8, 9, 9, 2, 8, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9), i++$

$i = 46$   $arr[46] = 9$   $j = 45$   $arr[j] = 2$   $2 < 9$

$arr[j+1] = number$

$(arr[46] = 9 \Rightarrow 7, 2, 8, 9, 3, 5, 8, 9, 9, 2, 8, 9, 9, 2, 8, 9, 9, 2, 8, 9, 9, 2, 8, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9), i++$

$i = 47$   $arr[47] = 7$   $j = 46$   $arr[j] = 9$   $9$

Selection sort ile sırala  $\nabla$  usun hali

$\{4, 7, 9, 2, 5\}$

$4|, 7, 9, 2, 5 \rightarrow 4, 7|, 9, 2, 5 \rightarrow 4, 7, 9|, 2, 5$

$\rightarrow 4, 7, 9, 2|, 5 \rightarrow 4, 7, 2, 9|, 5 \rightarrow 4, 2, 7, 9|, 5$

$\rightarrow 2, 4, 7, 9|, 5 \rightarrow 2, 4, 7, 9, 5| \rightarrow 2, 4, 7, 5, 9|$

$\rightarrow 2, 4, 5, 7, 9$

Arka Sayfadaki "Ünlem" ( $\nabla$ ) adına girilmiş nedenidir.