

## Bit Mask and Subset Generation

### Bit Mask and Subset Generation

Mask 0 (binary 000)

Bit Position i   1 << i   Mask & (1 << i)   Result (Decimal)   Included Characters

0   001 000 & 001 = 000 0   None

1   010 000 & 010 = 000 0   None

2   100 000 & 100 = 000 0   None

Subset: {}

Mask 1 (binary 001)

Bit Position i   1 << i   Mask & (1 << i)   Result (Decimal)   Included Characters

0   001 001 & 001 = 001 1   'a'

1   010 001 & 010 = 000 0   None

2   100 001 & 100 = 000 0   None

Subset: {a}

Mask 2 (binary 010)

Bit Position i   1 << i   Mask & (1 << i)   Result (Decimal)   Included Characters

0   001 010 & 001 = 000 0   None

1   010 010 & 010 = 010 2   'b'

2   100 010 & 100 = 000 0   None

Subset: {b}

Mask 3 (binary 011)

Bit Position i   1 << i   Mask & (1 << i)   Result (Decimal)   Included Characters

## Bit Mask and Subset Generation

0 001 011 & 001 = 001 1 'a'

1 010 011 & 010 = 010 2 'b'

2 100 011 & 100 = 000 0 None

Subset: {a, b}

Mask 4 (binary 100)

Bit Position i 1 << i Mask & (1 << i) Result (Decimal) Included Characters

0 001 100 & 001 = 000 0 None

1 010 100 & 010 = 000 0 None

2 100 100 & 100 = 100 4 'c'

Subset: {c}

Mask 5 (binary 101)

Bit Position i 1 << i Mask & (1 << i) Result (Decimal) Included Characters

0 001 101 & 001 = 001 1 'a'

1 010 101 & 010 = 000 0 None

2 100 101 & 100 = 100 4 'c'

Subset: {a, c}

Mask 6 (binary 110)

Bit Position i 1 << i Mask & (1 << i) Result (Decimal) Included Characters

0 001 110 & 001 = 000 0 None

1 010 110 & 010 = 010 2 'b'

2 100 110 & 100 = 100 4 'c'

Subset: {b, c}

## Bit Mask and Subset Generation

Mask 7 (binary 111)

Bit Position  $i$     $1 \ll i$    Mask &  $(1 \ll i)$    Result (Decimal)   Included Characters

0   001   111 & 001 = 001   1   'a'

1   010   111 & 010 = 010   2   'b'

2   100   111 & 100 = 100   4   'c'

Subset: {a, b, c}

Summary of All Subsets

Mask (Decimal)   Mask (Binary)   Subset

0   000   {}

1   001   {a}

2   010   {b}

3   011   {a, b}

4   100   {c}

5   101   {a, c}

6   110   {b, c}

7   111   {a, b, c}