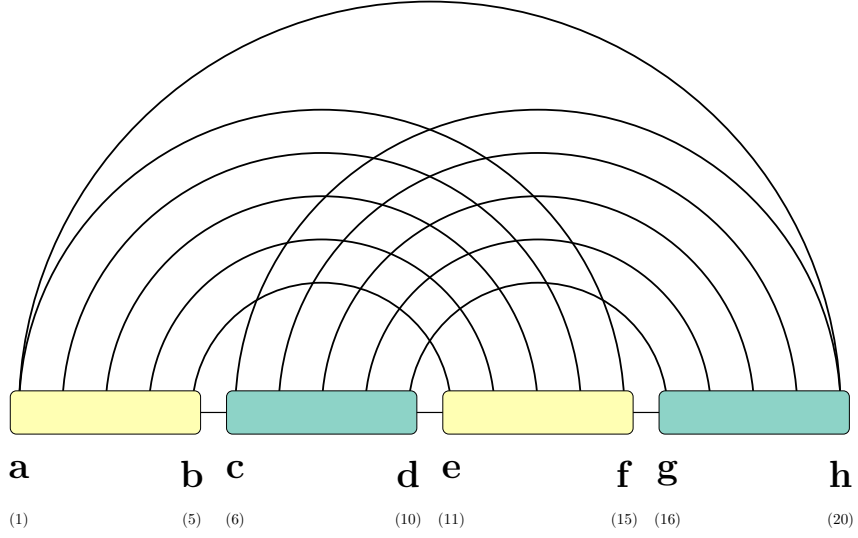


fatgraph name: **H**



first and last anchors, already given:  $a, h$

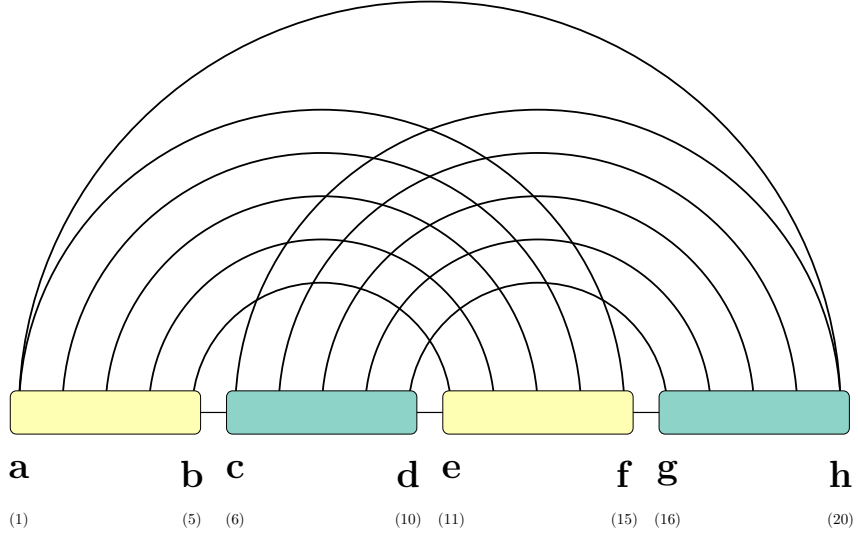
$$A = \min_{c,d,f} \left( B[c, f, d, h] + \text{yellow}[f, a \mid c, d] \right)$$

$$B[c, d, f, h] = \min_g \left( \text{teal}[c, d, g, h] \right)$$

$$\text{yellow}'[f, a \mid c, d] = \min \left\{ \text{yellow}'[f+1, a \mid c, d], \quad \text{if } f+1 \notin \{a, c, d\} \right.$$

$$\text{yellow}[f, a \mid c, d] = \min \begin{cases} \text{yellow}[f, a-1 \mid c, d], & \text{if } a-1 \notin \{f, c, d\} \\ \text{yellow}'[f+1, a \mid c, d], & \text{if } f+1 \notin \{a, c, d\} \\ \text{yellow}[f+1, a-1 \mid c, d] + \Delta G(f, a) & \text{if } \{f+1, a-1\} \cap \{c, d\} = \emptyset \end{cases}$$

fatgraph name: H2



first and last anchors, already given:  $a, h$

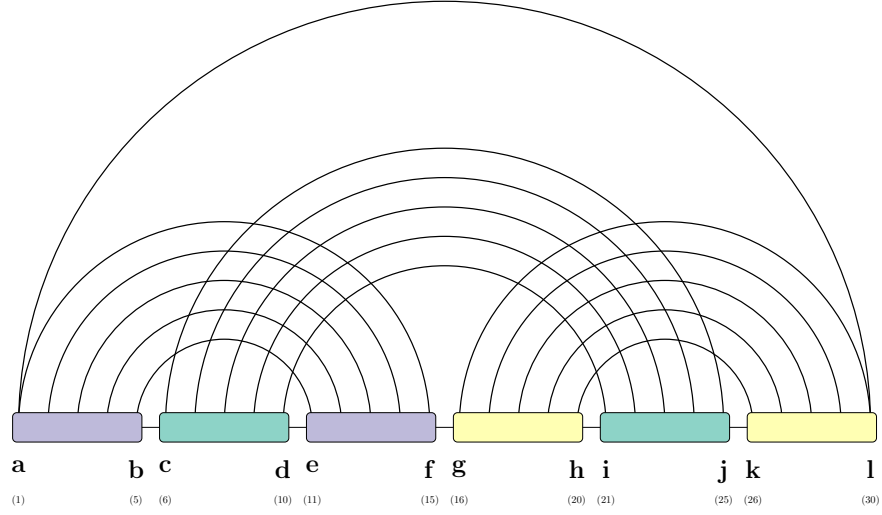
$$A = \min_{c,d,f} \left( B[h, f, d, c] + \text{yellow}[f, a \mid c, d] \right)$$

$$B[c, d, f, h] = \min_g \left( \text{teal}[c, d, g, h] \right)$$

$$\text{yellow}'[f, a \mid c, d] = \min \left\{ \text{yellow}'[f+1, a \mid c, d], \quad \text{if } f+1 \notin \{a, c, d\} \right.$$

$$\text{yellow}[f, a \mid c, d] = \min \begin{cases} \text{yellow}[f, a-1 \mid c, d], & \text{if } a-1 \notin \{f, c, d\} \\ \text{yellow}'[f+1, a \mid c, d], & \text{if } f+1 \notin \{a, c, d\} \\ \text{yellow}[f+1, a-1 \mid c, d] + \Delta G(f, a) & \text{if } \{f+1, a-1\} \cap \{c, d\} = \emptyset \end{cases}$$

fatgraph name: K



first and last anchors, already given:  $a, l$

$$A = \min_{f,h,k} (B[a, f, k, h] + G[f, k, h, l])$$

$$B[a, f, h, k] = \min_i (C[a, f, i, k])$$

$$C[a, f, i, k] = \min_j \left( \boxed{D}[a, f \mid i, j] \right)$$

$$\boxed{D}'[a, f \mid i, j] = \min \begin{cases} \boxed{D}'[a, f-1 \mid i, j], & \text{if } f-1, \notin \{a, i, j\} \\ \boxed{D}[a+1, f-1 \mid i, j] + \Delta G(a, f) & \text{if } \{a+1, f-1\} \cap \{i, j\} = \emptyset \end{cases}$$

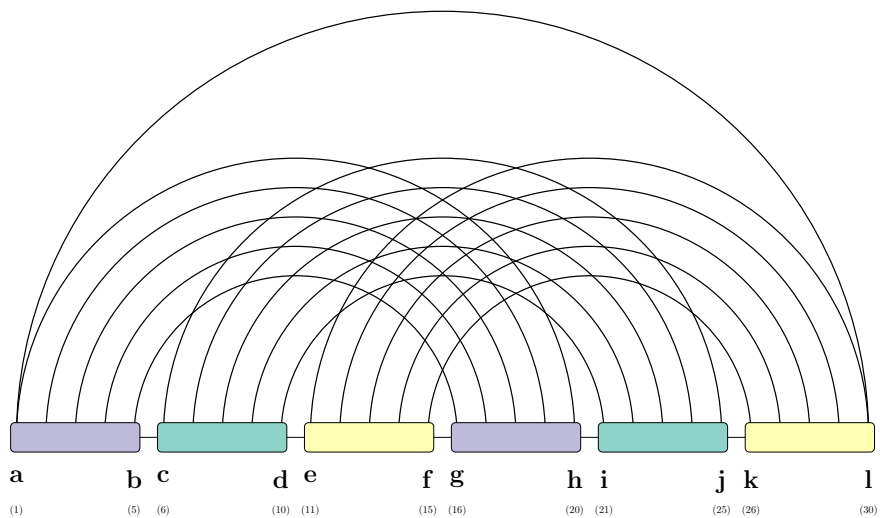
$$\boxed{D}[a, f \mid i, j] = \min \begin{cases} \boxed{D}[a+1, f \mid i, j], & \text{if } a+1 \notin \{f, i, j\} \\ \boxed{D}'[a, f-1 \mid i, j], & \text{if } f-1, \notin \{a, i, j\} \\ \boxed{D}[a+1, f-1 \mid i, j] + \Delta G(a, f) & \text{if } \{a+1, f-1\} \cap \{i, j\} = \emptyset, \\ E[f, a, i, j] \end{cases}$$

$$E[b, e, i, j] = \min_c (F[e, c, i, j])$$

$$F[c, e, i, j] = \min_d \left( \boxed{C_{\boxtimes}}[c, d, i, j] \right)$$

$$G[f, h, k, l] = \min_g \left( \boxed{C_{\boxtimes}}[g, h, k, l] \right)$$

fatgraph name: L



first and last anchors, already given:  $a, l$

$$A = \min_{d,f,k} (B[d, a, k, f] + G[d, l, k, f])$$

$$B[a, d, f, k] = \min_g (C[d, g, k, a])$$

$$C[a, d, g, k] = \min_{b,h} \left( C_{\boxtimes}[a, b, g, h] + D[d, h, b, k] \right)$$

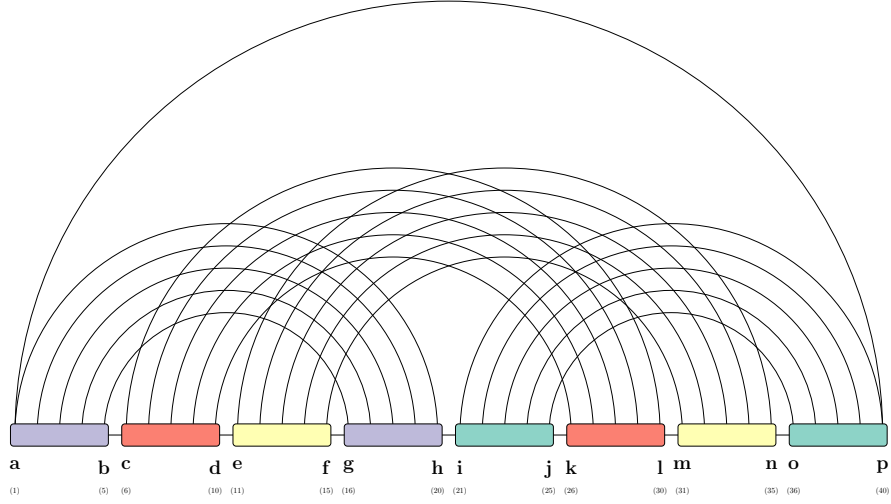
$$D[b, d, h, k] = \min_c (E[d, c, h, k])$$

$$E[c, d, h, k] = \min_j (F[d, c, h, j])$$

$$F[c, d, h, j] = \min_i \left( C_{\boxtimes}[c, d, i, j] \right)$$

$$G[d, f, k, l] = \min_e \left( C_{\boxtimes}[e, f, k, l] \right)$$

fatgraph name: M



first and last anchors, already given:  $a, p$

$$A = \min_{i,j,n} (B[j, i, a, n] + I[j, i, n, p])$$

$$B[a, i, j, n] = \min_{b,g} (C[j, b, g, n] + H[i, b, g, a])$$

$$C[b, g, j, n] = \min_{c,f} (D[j, c, n, f])$$

$$D[c, f, j, n] = \min_{d,l} (E[j, l, c, d] + F[l, n, f, d])$$

$$E[c, d, j, l] = \min_k \left( C_{\boxtimes}[c, d, k, l] \right)$$

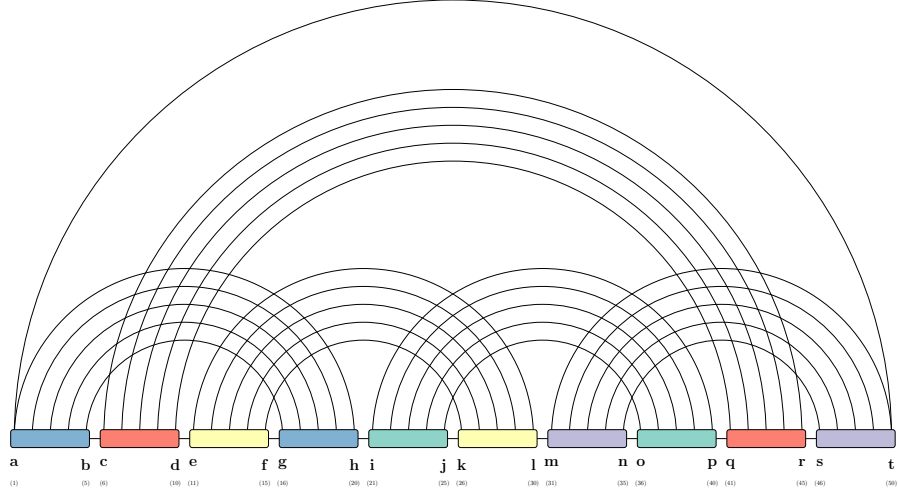
$$F[d, f, l, n] = \min_e (G[e, l, n, f])$$

$$G[e, f, l, n] = \min_m \left( C_{\boxtimes}[e, f, m, n] \right)$$

$$H[a, b, g, i] = \min_h \left( C_{\boxtimes}[a, b, g, h] \right)$$

$$I[i, j, n, p] = \min_o \left( C_{\boxtimes}[i, j, o, p] \right)$$

fatgraph name: C5



first and last anchors, already given:  $a, t$

$$A = \min_{m,n,r} (B[r, n, m, a] + M[r, t, n, m])$$

$$B[a, m, n, r] = \min_l (C[r, n, l, a])$$

$$C[a, l, n, r] = \min_{h,k,p} \left( \boxed{D}[a, h \mid r, p, l, k] + J[n, a, k, h, p] \right)$$

$$\boxed{D}'[a, h \mid r, p, l, k] = \min \begin{cases} \boxed{D}'[a, h-1 \mid r, p, l, k], & \text{if } h-1 \notin \{a, r, p, l, k\} \\ \boxed{D}[a+1, h-1 \mid r, p, l, k] + \Delta G(a, h) & \text{if } \{a+1, h-1\} \cap \{r, p, l, k\} = \emptyset \end{cases}$$

$$\boxed{D}[a, h \mid r, p, l, k] = \min \begin{cases} \boxed{D}[a+1, h \mid r, p, l, k], & \text{if } a+1 \notin \{h, r, p, l, k\} \\ \boxed{D}'[a, h-1 \mid r, p, l, k], & \text{if } h-1 \notin \{a, r, p, l, k\} \\ \boxed{D}[a+1, h-1 \mid r, p, l, k] + \Delta G(a, h) & \text{if } \{a+1, h-1\} \cap \{r, p, l, k\} = \emptyset, \\ E[h, k, r, p, l, a] \end{cases}$$

$$E[b, g, k, l, p, r] = \min_e (F[r, p, b, e] + I[k, e, g, l, b])$$

$$F[b, e, p, r] = \min_c (G[r, p, c, e])$$

$$G[c, e, p, r] = \min_q (H[r, c, e, q])$$

$$H[c, e, q, r] = \min_d \left( \boxed{C_{\boxtimes}}[c, d, q, r] \right)$$

$$I[b, e, g, k, l] = \min_f \left( \boxed{C_{\boxtimes}}[e, f, k, l] \right)$$

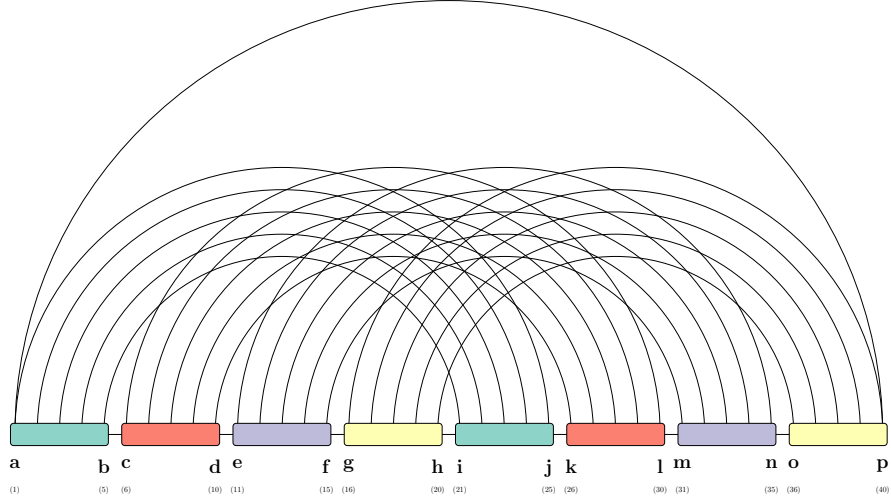
$$J[a,h,k,n,p]=\min_i(K[n,i,p,k])$$

$$K[i,k,n,p]=\min_o(L[p,o,i,k])$$

$$L[i,k,o,p]=\min_j\left(C_{\boxtimes}[i,j,o,p]\right)$$

$$M[m,n,r,t]=\min_s\left(C_{\boxtimes}[m,n,s,t]\right)$$

fatgraph name: K4



first and last anchors, already given:  $a, p$

$$A' [p, g \mid a, f] = \min \begin{cases} A' [p, g-1 \mid a, f], & \text{if } g-1, \notin \{p, a, f\} \\ A [p+1, g-1 \mid a, f] + \Delta G(p, g) & \text{if } \{p+1, g-1\} \cap \{a, f\} = \emptyset \end{cases}$$

$$A [p, g \mid a, f] = \min \begin{cases} A [p+1, g \mid a, f], & \text{if } p+1 \notin \{g, a, f\} \\ A' [p, g-1 \mid a, f], & \text{if } g-1, \notin \{p, a, f\} \\ A [p+1, g-1 \mid a, f] + \Delta G(p, g) & \text{if } \{p+1, g-1\} \cap \{a, f\} = \emptyset, \\ B[f, g, a, p] \end{cases}$$

$$B[a, f, h, o] = \min_n (C[f, h, a, n])$$

$$C[a, f, h, n] = \min_{e, m} \left( D[m, h, a, e] + C_{\boxtimes}[e, f, m, n] \right)$$

$$D[a, e, h, m] = \min_{c, j} (E[c, m, j, e] + H[c, j, h, a])$$

$$E[c, e, j, m] = \min_l (F[c, j, l, e])$$

$$F[c, e, j, l] = \min_d (G[c, j, l, d])$$

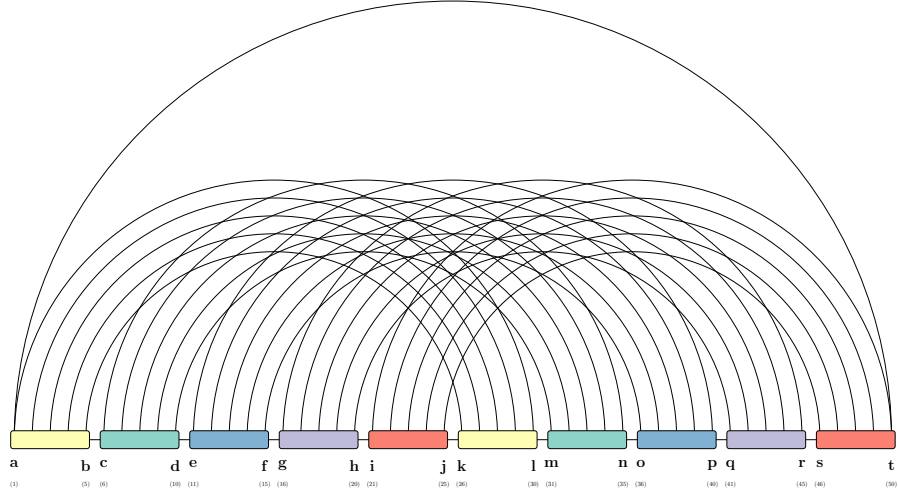
$$G[c, d, j, l] = \min_k \left( C_{\boxtimes}[c, d, k, l] \right)$$

$$H[a, c, h, j] = \min_i (I[c, j, i, a])$$

$$I[a, c, i, j] = \min_b \left( C_{\boxtimes}[a, b, i, j] \right)$$



fatgraph name: K5



first and last anchors, already given:  $a, t$

$$A = \min_{i,j,r} (B[r, j, a, i] + K[t, r, j, i])$$

$$B[a, i, j, r] = \min_h (C[h, r, j, a])$$

$$C[a, h, j, r] = \min_{g,q} (D[q, j, g, a] + C_{\boxtimes}[g, h, q, r])$$

$$D[a, g, j, q] = \min_{c,l} (E[c, g, q, l] + J[a, l \mid c, j])$$

$$E[c, g, l, q] = \min_{d,n} (F[c, n, d, l] + G[n, d, g, q])$$

$$F[c, d, l, n] = \min_m (C_{\boxtimes}[c, d, m, n])$$

$$G[d, g, n, q] = \min_p (H[n, d, g, p])$$

$$H[d, g, n, p] = \min_e (I[p, e \mid n, g])$$

$$I'[p, e \mid n, g] = \min \begin{cases} I'[p, e-1 \mid n, g], & \text{if } e-1 \notin \{p, n, g\} \\ I[p+1, e-1 \mid n, g] + \Delta G(p, e) & \text{if } \{p+1, e-1\} \cap \{n, g\} = \emptyset \end{cases}$$

$$I[p, e \mid n, g] = \min \begin{cases} I[p+1, e \mid n, g], & \text{if } p+1 \notin \{e, n, g\} \\ I'[p, e-1 \mid n, g], & \text{if } e-1 \notin \{p, n, g\} \\ I[p+1, e-1 \mid n, g] + \Delta G(p, e) & \text{if } \{p+1, e-1\} \cap \{n, g\} = \emptyset \end{cases}$$

$$\begin{aligned}
J' [a, l \mid c, j] &= \min \begin{cases} J' [a, l-1 \mid c, j], & \text{if } l-1, \notin \{a, c, j\} \\ J [a+1, l-1 \mid c, j] + \Delta G(a, l) & \text{if } \{a+1, l-1\} \cap \{c, j\} = \emptyset \end{cases} \\
J [a, l \mid c, j] &= \min \begin{cases} J [a+1, l \mid c, j], & \text{if } a+1 \notin \{l, c, j\} \\ J' [a, l-1 \mid c, j], & \text{if } l-1, \notin \{a, c, j\} \\ J [a+1, l-1 \mid c, j] + \Delta G(a, l) & \text{if } \{a+1, l-1\} \cap \{c, j\} = \emptyset \end{cases} \\
K [i, j, r, t] &= \min_s \left( C_{\boxtimes} [i, j, s, t] \right)
\end{aligned}$$