



پیوست

شبه‌کد الگوریتم‌های پیشنهادی

Algorithm ۱ Pick First Edge**Require:** Evaluation graph $G = (V, E)$ **Ensure:** Acyclic evaluation graph $G' = (V', E')$ ۱: $G' = G$ ۲: **while** the graph G' is not acyclic.۳: choose a cycle, C , of G' .۴: delete first edge, e , of C .۵: $G' = G'(V, E \setminus e)$ ۶: **end while****Algorithm ۲** Pick Last Edge**Require:** Evaluation graph $G = (V, E)$ **Ensure:** Acyclic evaluation graph $G' = (V', E')$ ۱: $G' = G$ ۲: **while** the graph G' is not acyclic.۳: choose a cycle, C , of G' .۴: delete last edge, e , of C .۵: $G' = G'(V, E \setminus e)$ ۶: **end while****Algorithm ۳** Pick Random Edge**Require:** Evaluation graph $G = (V, E)$ **Ensure:** Acyclic evaluation graph $G' = (V', E')$ ۱: $G' = G$ ۲: **while** the graph G' is not acyclic.۳: choose a cycle, C , of G' .



ξ: delete a random edge, e , of C .

∘: $G' = G'(V, E \setminus e)$

↯: end while

Algorithm 4 Minimum Cost

Require: Evaluation graph $G = (V, E)$ and the number of repetition d .

Ensure: Acyclic evaluation graph $G' = (V', E')$

↱: $i = 1$

↲: while $i \leq d$

↯: $G_i = G$

ξ: while the graph G_i is not acyclic.

∘: choose a cycle, C of G_i .

↯: delete a random edge, e , of C .

↯: $G_i = G_i(V, E \setminus e)$

↯: end while

↯: $s_i = \text{size}(G_i)$

↯: $i = i + 1$

↯: end while

↯: G' is the graph G_i with maximum s_i

Algorithm 5 Pick Edge with Minimum Weight

Require: Weighted evaluation graph $\bar{G} = (V, E)$

Ensure: Weighted acyclic evaluation graph $\bar{G}' = (V', E')$

↱: $\bar{G}' = \bar{G}$

↲: while the $\bar{G}'$ is not acyclic.

↯: choose a cycle, C of $\bar{G}'$

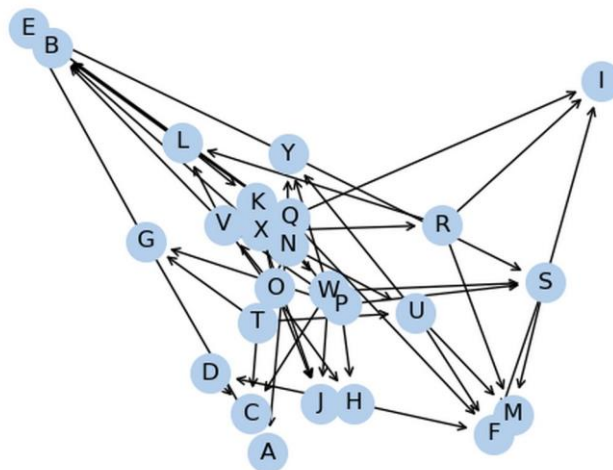
ξ: delete edge with minimum weight of C , e .

∘: $\bar{G}' = \bar{G}'(V, E \setminus e)$

↯-end while

گراف‌های ارزیابی بدون دور

* نتیجه اجرای الگوریتم ۱ روی گراف ارزیابی متوالی G_S



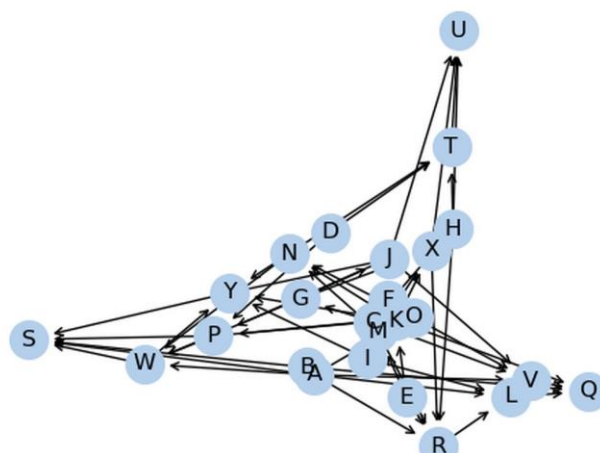
شکل ۵. گراف ارزیابی متوالی بدون دور G'_S

یال‌های گراف G'_S :

$(C, A), (E, B), (D, C), (G, A), (G, E), (H, D), (H, F), (K, Q), (J, H), (M, F),$
 $(L, Q), (L, K), (L, B), (O, K), (O, J), (O, V), (O, N), (N, Y), (N, T), (N, W),$
 $(Q, A), (Q, I), (Q, B), (Q, E), (Q, F), (P, H), (P, S), (P, G), (P, W), (S, I),$
 $(S, M), (S, F), (R, I), (R, M), (R, L), (U, Y), (U, M), (U, F), (T, C), (T, U),$
 $(T, G), (W, Y), (W, C), (W, J), (W, S), (W, K), (V, Q), (V, H), (V, B), (V, L),$
 $(V, P), (Y, S), (Y, E), (X, B), (X, R), (X, U), (X, J)$



* نتیجه اجرای الگوریتم ۲ روی گراف ارزیابی متوالی G_S

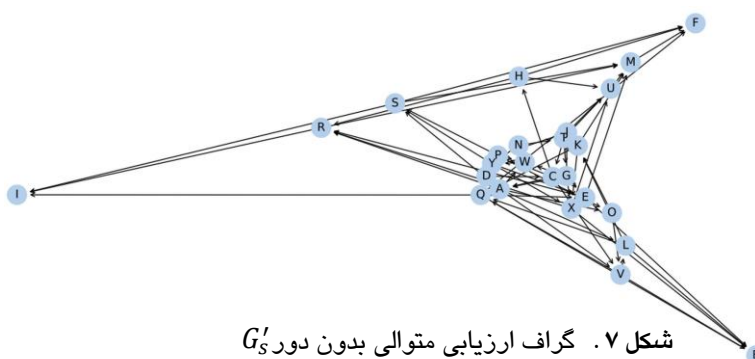


شکل ۶. گراف ارزیابی متوالی بدون دور G'_S

یالهای گراف G'_S :

$(A, L), (A, O), (A, S), (A, R), (A, W), (A, V), (C, H), (C, V), (C, G), (C, P),$
 $(B, Q), (B, S), (E, K), (E, R), (E, M), (D, P), (D, T), (G, X), (G, J), (G, W),$
 $(F, I), (F, O), (I, Y), (I, L), (H, R), (H, U), (H, T), (K, Q), (K, X), (K, M),$
 $(K, Y), (K, N), (J, X), (J, V), (J, U), (J, P), (M, X), (M, R), (M, N), (L, Q),$
 $(O, N), (O, V), (N, Y), (N, T), (N, W), (P, S), (P, W), (P, O), (R, L), (T, U),$
 $(W, Y), (W, S), (V, Q), (V, L), (Y, X), (Y, S), (X, R), (X, U)$

* نتیجه اجرای الگوریتم ۳ روی گراف ارزیابی متوالی G_S

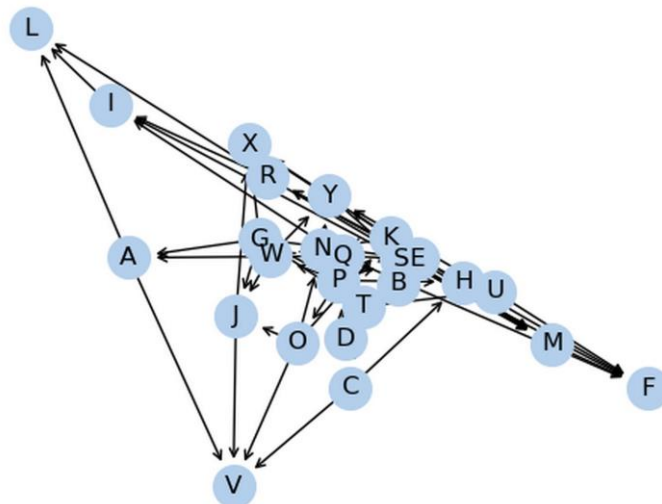


شکل ۷. گراف ارزیابی متوالی بدون دور G'_S

یال‌های گراف G'_S :

$(A, L), (A, O), (A, S), (A, R), (A, W), (A, V), (C, A), (C, H), (C, V), (C, G),$
 $(C, P), (E, B), (E, R), (E, M), (D, P), (D, C), (G, A), (G, X), (G, J), (G, E),$
 $(G, W), (H, R), (H, U), (H, F), (K, Q), (K, X), (K, M), (J, P), (J, U), (M, F),$
 $(L, Q), (L, K), (L, B), (O, K), (O, V), (N, Y), (N, T), (N, W), (Q, I), (Q, B),$
 $(Q, E), (Q, F), (P, S), (P, W), (P, O), (S, I), (S, M), (S, F), (R, I), (R, M),$
 $(U, M), (T, C), (T, U), (T, G), (W, Y), (V, Q), (V, B), (V, L), (Y, X), (Y, S),$
 $(Y, E), (X, R), (X, B), (X, U)$

*نتیجه اجرای الگوریتم ۴ روی گراف ارزیابی متوالی G_S

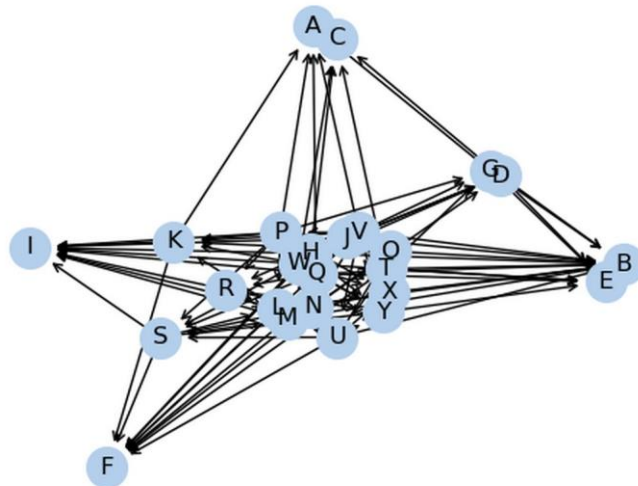


شکل ۸. گراف ارزیابی متوالی بدون دور G'_S

یال‌های گراف G'_S :

$(A, S), (A, R), (A, L), (A, W), (C, A), (C, H), (C, P), (C, G), (C, V), (B, S),$
 $(E, R), (E, B), (E, M), (E, K), (D, P), (D, C), (D, T), (G, X), (G, J), (G, E),$
 $(G, W), (F, I), (H, R), (H, F), (K, Q), (K, X), (K, M), (K, Y), (K, N), (J, U),$
 $(M, N), (M, F), (L, Q), (L, B), (O, K), (O, J), (O, V), (O, N), (N, Y), (N, W),$
 $(Q, I), (Q, B), (Q, F), (P, H), (P, S), (P, G), (P, W), (S, I), (S, F), (R, I),$
 $(R, M), (R, L), (U, F), (T, C), (T, U), (T, G), (W, S), (V, Q), (V, H), (V, B),$
 $(V, L), (V, P), (Y, X), (Y, S), (X, B), (X, J), (X, U)$

* نتیجه اجرای الگوریتم ۱ روی گراف ارزیابی کلی G_t



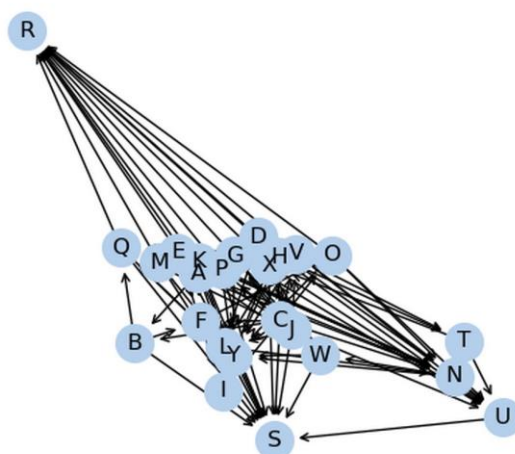
شکل ۹. گراف ارزیابی کلی بدون دور G'_t

یال‌های گراف G'_t :

$(C, A), (E, B), (D, C), (D, B), (D, E), (G, A), (G, B), (G, E), (H, I), (H, C),$
 $(H, B), (H, D), (H, F), (K, A), (K, I), (K, F), (J, I), (J, H), (J, B), (J, D),$
 $(M, I), (M, B), (M, F), (L, I), (L, K), (L, B), (L, F), (O, H), (O, K), (O, B),$
 $(O, J), (N, D), (N, F), (N, H), (N, J), (N, O), (N, U), (Q, A), (Q, B), (Q, E),$
 $(Q, F), (Q, I), (Q, M), (Q, S), (Q, R), (Q, Y), (P, A), (P, G), (P, I), (P, H),$
 $(P, K), (P, L), (P, O), (P, N), (P, S), (P, R), (P, W), (P, Y), (P, X), (S, I),$
 $(S, M), (S, L), (S, F), (R, I), (R, Y), (R, M), (R, L), (R, N), (U, B), (U, F),$
 $(U, M), (U, O), (U, S), (U, Y), (U, X), (T, C), (T, B), (T, E), (T, G), (T, F),$
 $(T, J), (T, O), (T, U), (T, V), (T, X), (W, C), (W, E), (W, D), (W, F), (W, I),$
 $(W, H), (W, K), (W, J), (W, S), (W, Y), (W, X), (V, A), (V, B), (V, G), (V, H),$
 $(V, K), (V, L), (V, N), (V, Q), (V, P), (V, R), (V, U), (V, Y), (Y, S), (Y, E),$
 $(X, S), (X, B), (X, J)$



* نتیجه اجرای الگوریتم ۲ روی گراف ارزیابی کلی G_t



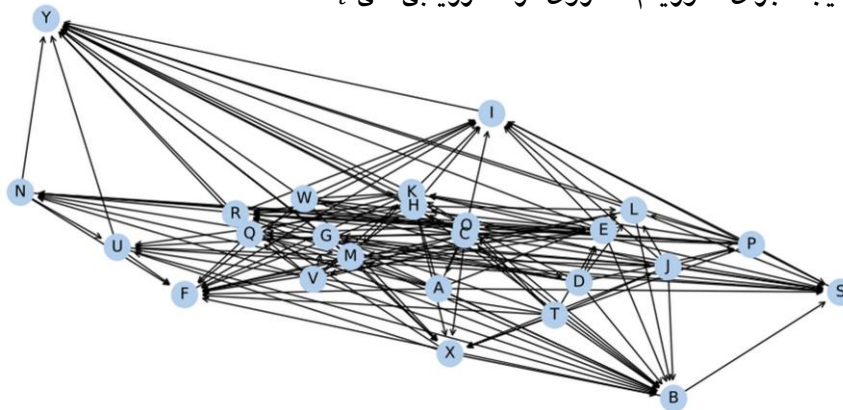
شکل ۱۰. گراف ارزیابی کلی بدون دور G'_t

یال‌های گراف G'_t :

$(A, B), (A, F), (A, K), (A, M), (A, L), (A, O), (A, N), (A, Q), (A, S), (A, R),$
 $(A, W), (A, V), (A, X), (C, B), (C, E), (C, G), (C, F), (C, I), (C, H), (C, O),$
 $(C, N), (C, P), (C, S), (C, W), (C, V), (C, Y), (B, Q), (B, S), (B, F), (E, F),$
 $(E, I), (E, K), (E, M), (E, N), (E, R), (E, Y), (D, G), (D, H), (D, L), (D, O),$
 $(D, N), (D, P), (D, R), (D, T), (G, J), (G, R), (G, U), (G, W), (G, Y), (G, X),$
 $(F, I), (F, O), (I, Y), (I, S), (I, L), (H, L), (H, R), (H, U), (H, T), (H, V),$
 $(H, Y), (K, M), (K, N), (K, Q), (K, S), (K, R), (K, Y), (K, X), (J, L), (J, Q),$
 $(J, P), (J, S), (J, U), (J, V), (J, X), (M, Y), (M, X), (M, S), (M, R), (M, N),$
 $(L, Q), (L, Y), (L, S), (L, N), (O, N), (O, Q), (O, R), (O, U), (O, V), (O, Y),$
 $(O, X), (N, Y), (N, U), (N, T), (N, W), (Q, Y), (Q, S), (Q, R), (P, N), (P, S),$
 $(P, R), (P, W), (P, Y), (P, X), (U, S), (T, X), (T, U), (W, Y), (W, X), (W, S),$
 $(V, Q), (V, Y), (V, R), (V, U), (V, N), (Y, X), (Y, S), (X, S), (X, R), (X, U)$



* نتیجه اجرای الگوریتم ۳ روی گراف ارزیابی کلی G_t

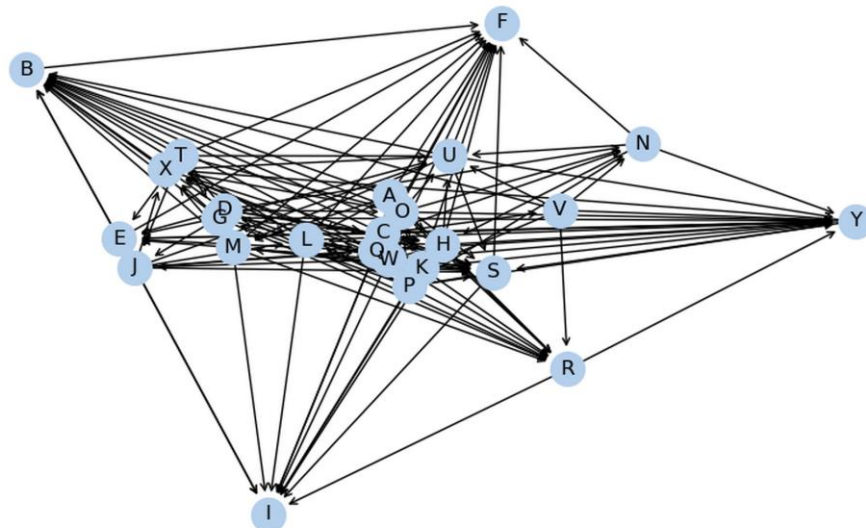


شکل ۱۱. گراف ارزیابی کلی بدون دور G'_t

یال‌های گراف G'_t :

$(A, B), (A, F), (A, K), (A, M), (A, L), (A, O), (A, N), (A, Q), (A, S), (C, A),$
 $(C, B), (C, E), (C, G), (C, F), (C, I), (C, H), (C, O), (C, N), (C, P), (C, S),$
 $(C, W), (C, V), (C, Y), (B, S), (B, F), (E, B), (E, F), (E, I), (E, K), (E, M),$
 $(E, N), (E, R), (E, Y), (D, B), (D, E), (D, G), (D, L), (D, O), (D, N), (D, P),$
 $(D, R), (G, B), (G, E), (G, J), (G, R), (G, U), (G, Y), (G, X), (F, I), (I, Y), (H, B),$
 $(H, F), (H, I), (H, L), (H, R), (H, U), (H, Y), (K, F), (K, I), (K, M), (K, Q),$
 $(K, S), (K, R), (K, Y), (K, X), (J, B), (J, I), (J, H), (J, L), (J, Q), (J, P), (J, S),$
 $(J, U), (J, X), (M, B), (M, F), (M, S), (M, R), (M, Y), (M, X), (L, I), (L, Y),$
 $(L, S), (L, B), (L, F), (O, B), (O, K), (O, Q), (O, R), (O, Y), (O, X), (N, Y),$
 $(N, U), (N, O), (N, F), (Q, B), (Q, F), (Q, I), (Q, M), (Q, S), (Q, R), (Q, Y),$
 $(P, I), (P, K), (P, L), (P, O), (P, N), (P, S), (P, R), (P, Y), (P, X), (S, I), (R, I),$
 $(R, Y), (U, Y), (U, S), (U, B), (U, F), (T, C), (T, B), (T, E), (T, G), (T, F),$
 $(T, J), (T, O), (T, U), (T, X), (W, E), (W, D), (W, F), (W, I), (W, K), (W, S),$
 $(W, Y), (W, X), (V, B), (V, G), (V, H), (V, K), (V, L), (V, N), (V, Q), (V, R),$
 $(X, B), (X, R), (X, U)$

* نتیجه اجرای الگوریتم ۴ روی گراف ارزیابی کلی G_t



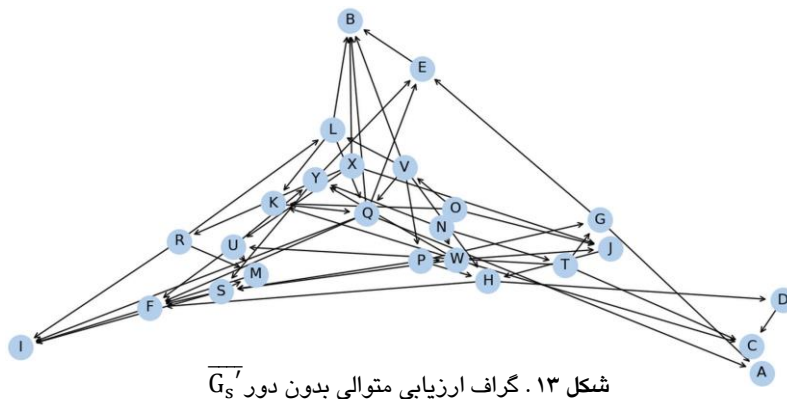
شکل ۱۲. گراف ارزیابی کلی بدون دور G'_t

یال‌های گراف G'_t :

$(A, B), (A, F), (A, K), (A, M), (A, L), (A, O), (A, Q), (A, S), (A, R), (C, A),$
 $(C, B), (C, E), (C, G), (C, F), (C, I), (C, H), (C, O), (C, N), (C, P), (C, S),$
 $(C, W), (C, V), (C, Y), (B, F), (E, I), (E, B), (E, F), (D, C), (D, B), (D, E),$
 $(D, G), (D, H), (D, L), (D, O), (D, N), (D, R), (D, T), (G, B), (G, E), (G, J),$
 $(G, R), (G, U), (G, W), (G, Y), (G, X), (H, B), (H, F), (H, I), (H, L), (H, R),$
 $(H, U), (H, Y), (K, F), (K, I), (K, M), (K, Q), (K, S), (K, R), (K, Y), (K, X),$
 $(J, B), (J, I), (J, H), (J, L), (J, Q), (J, S), (J, U), (J, X), (M, B), (M, F), (M, I),$
 $(M, S), (M, R), (M, X), (L, B), (L, F), (L, I), (L, K), (L, Q), (L, S), (L, Y),$
 $(O, B), (O, H), (O, K), (O, N), (O, Q), (O, R), (O, U), (O, Y), (O, X), (N, Y),$
 $(N, H), (N, U), (N, F), (Q, B), (Q, E), (Q, F), (Q, I), (Q, S), (Q, R), (Q, Y),$
 $(P, A), (P, G), (P, I), (P, H), (P, K), (P, L), (P, O), (P, N), (P, S), (P, R),$
 $(P, W), (P, Y), (P, X), (S, I), (S, F), (R, I), (R, Y), (U, B), (U, F), (U, M),$
 $(U, S), (U, Y), (U, X), (T, B), (T, E), (T, G), (T, F), (T, J), (T, O), (T, U),$
 $(T, X), (W, E), (W, F), (W, I), (W, H), (W, K), (W, J), (W, S), (W, Y),$
 $(W, X), (V, B), (V, K), (V, N), (V, R), (V, U), (V, Y), (Y, X), (Y, S), (Y, E),$
 $(X, S), (X, B)$



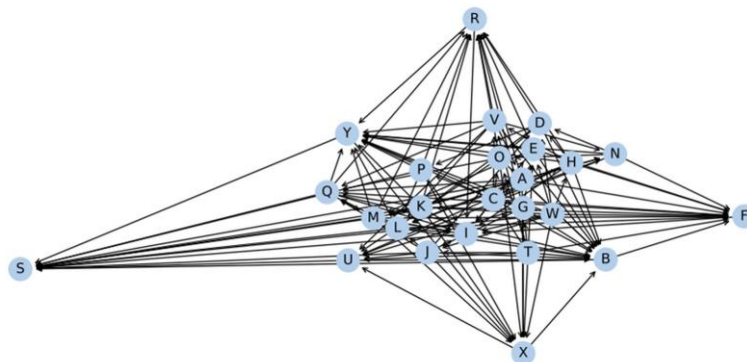
* نتیجه اجرای الگوریتم ۵ روی گراف ارزیابی متوالی وزن دار $\overline{G_s}$



یال‌های گراف $\overline{G_s'}$:

$(C, A), (E, B), (D, C), (G, A), (G, E), (F, I), (H, D), (H, F), (K, Q), (J, H),$
 $(M, F), (L, Q), (L, K), (L, B), (O, N), (O, K), (O, J), (O, V), (N, Y), (N, T),$
 $(N, W), (Q, A), (Q, I), (Q, B), (Q, E), (Q, F), (P, H), (P, S), (P, W), (P, G),$
 $(S, I), (S, M), (S, F), (R, I), (R, M), (R, L), (U, Y), (U, M), (U, F), (T, C),$
 $(T, U), (T, G), (W, Y), (W, C), (W, J), (W, S), (W, K), (V, Q), (V, H), (V, B),$
 $(V, L), (V, P), (Y, S), (Y, E), (X, R), (X, B), (X, U), (X, J)$

* نتیجه اجرای الگوریتم ۵ روی گراف ارزیابی کلی وزن دار $\overline{G_t}$





یال‌های گراف $\overline{G_s}$:

$(A, B), (A, F), (A, K), (A, M), (A, L), (A, O), (A, N), (A, Q), (A, S), (A, R),$
 $(A, X), (C, A), (C, B), (C, E), (C, G), (C, F), (C, I), (C, H), (C, O), (C, N),$
 $(C, P), (C, S), (C, W), (C, V), (C, Y), (B, S), (B, F), (E, B), (E, F), (E, I),$
 $(E, M), (E, R), (E, Y), (D, B), (D, E), (D, L), (D, O), (D, P), (D, R), (G, B),$
 $(G, E), (G, J), (G, R), (G, U), (G, Y), (G, X), (F, I), (I, S), (H, B), (H, D), (H, F),$
 $(H, I), (H, L), (H, R), (H, U), (H, V), (H, Y), (K, F), (K, I), (K, M), (K, N),$
 $(K, Q), (K, S), (K, R), (K, Y), (K, X), (J, B), (J, D), (J, I), (J, L), (J, Q), (J, S),$
 $(J, U), (J, X), (M, B), (M, F), (M, I), (M, S), (M, R), (M, Y), (M, X), (L, B),$
 $(L, F), (L, I), (L, Q), (L, S), (L, Y), (O, B), (O, Q), (O, R), (O, U), (O, Y), (O, X),$
 $(N, Y), (N, U), (N, D), (N, O), (N, F), (Q, B), (Q, F), (Q, I), (Q, M), (Q, S),$
 $(Q, R), (Q, Y), (P, I), (P, L), (P, S), (P, R), (P, Y), (P, X), (R, I), (R, Y), (U, S),$
 $(U, B), (T, C), (T, B), (T, E), (T, G), (T, F), (T, J), (T, O), (T, U), (T, V), (T, X),$
 $(W, E), (W, D), (W, F), (W, I), (W, H), (W, K), (W, J), (W, S), (W, Y),$
 $(W, X), (V, A), (V, B), (V, L), (V, N), (V, Q), (V, R), (V, U), (V, Y), (Y, X),$
 $(Y, S), (X, B), (X, U)$