Possibly Useful Formulas

Admissible: $\hat{h}(n) \leq h(n)$

Consistent: $\hat{h}(n) - \hat{h}(m) \leq h(n,m)$

Value Iteration: $u_i(s) = r(s) + \gamma \max_a \sum_{s'} P(s'|s,a) u_{i-1}(s)$

Policy Evaluation: $u_\pi(s) = r(s) + \gamma \sum_{s'} P(s'|s,\pi(s)) u_\pi(s')$

Policy Improvement: $\pi_{i+1}(s) = \operatorname{argmax}_a \sum_{s'} P(s'|s,a) u_{\pi_i}(s')$

Alpha-Beta Max Node: $v = \max(v, \text{child}); \quad \alpha = \max(\alpha, \text{child})$

Alpha-Beta Min Node: $v = \min(v, \text{child}); \quad \beta = \min(\beta, \text{child})$

Expectiminimax: $u(s) = \begin{cases} \max_a \sum_{s'} P(s'|a,a) u(s') & s \in \text{max states} \\ \min_a \sum_{s'} P(s'|a,a) u(s') & s \in \text{min states} \end{cases}$

Mixed Nash Equilibrium:
$$P(A=0) r_B(0,0) + P(A=1) r_B(1,0) = P(A=0) r_B(0,1) + P(A=1) r_B(1,1)$$
$$P(B=0) r_A(0,0) + P(B=1) r_A(0,1) = P(B=0) r_A(1,0) + P(B=1) r_A(1,1)$$

Unification: $S : \{\mathcal{V}_P, \mathcal{V}_Q\} \to \{\mathcal{V}_Q, \mathcal{C}\}$ such that $S(P) = S(Q) = U$

CBOW Generative: $\mathcal{L} = -\frac{1}{T} \sum_{t=1}^{T} \sum_{j=-c, j\neq 0}^{c} \ln \frac{\exp(\mathbf{v}_t^T \mathbf{v}_{t_j})}{\sum_{\mathbf{v} \in \mathcal{V}} \exp(\mathbf{v}^T \mathbf{v}_{t+j})}$

Skip-gram Contrastive: $\mathcal{L} = -\frac{1}{T} \sum_{t=1}^{T} \left(\sum_{\mathbf{v}' \in \mathcal{D}_+(w_t)} \ln \frac{1}{1+e^{-\mathbf{v}'^T \mathbf{v}_t}} + \sum_{\mathbf{v}' \in \mathcal{D}_-(w_t)} \ln \frac{1}{1+e^{\mathbf{v}'^T \mathbf{v}_t}} \right)$

Transformer: $\mathbf{c}_t = \sum_s \alpha(t,s) \mathbf{v}_s$

Attention: $\alpha(t,s) = \frac{\exp(\mathbf{q}_t^T \mathbf{k}_s)}{\sum_{s'} \exp(\mathbf{q}_t^T \mathbf{k}_{s'})}$