Statistical Data Mining II
Extra credit

Name:
Directions: Complete each exercise **alone**. By submitting, you affirm that you do not give or receive assistance from other students.

1) (10 points) Assume the following complete list of conditional independence statements that satisfy a probability distribution P(A,B,C,D,E).

$A \perp\!\!\!\perp D \mid \{B, C\}$
$A \perp\!\!\!\perp D \mid \{B, C, E\}$
$A \perp\!\!\!\perp E \mid C$
$A \perp\!\!\!\perp E \mid \{B, C\}$
$A \perp\!\!\!\perp E \mid \{C, D\}$
$A \perp\!\!\!\perp E \mid \{B, C, D\}$

$B \perp\!\!\!\perp C \mid A$
$B \perp\!\!\!\perp C \mid \{A, E\}$
$B \perp\!\!\!\perp E \mid A$
$B \perp\!\!\!\perp E \mid C$
$B \perp\!\!\!\perp E \mid \{A, C\}$
$B \perp\!\!\!\perp E \mid \{C, D\}$
$B \perp\!\!\!\perp E \mid \{A, C, D\}$

$D \perp\!\!\!\perp E \mid C$
$D \perp\!\!\!\perp E \mid \{B, C\}$
$D \perp\!\!\!\perp E \mid \{A, C\}$
$D \perp\!\!\!\perp E \mid \{A, B, C\}$

a) Draw a Directed Acyclic Graph that satisfies these assumptions.

b) Use the structure of the graph you found in Part A to write the joint distribution, P(A,B,C,D,E).