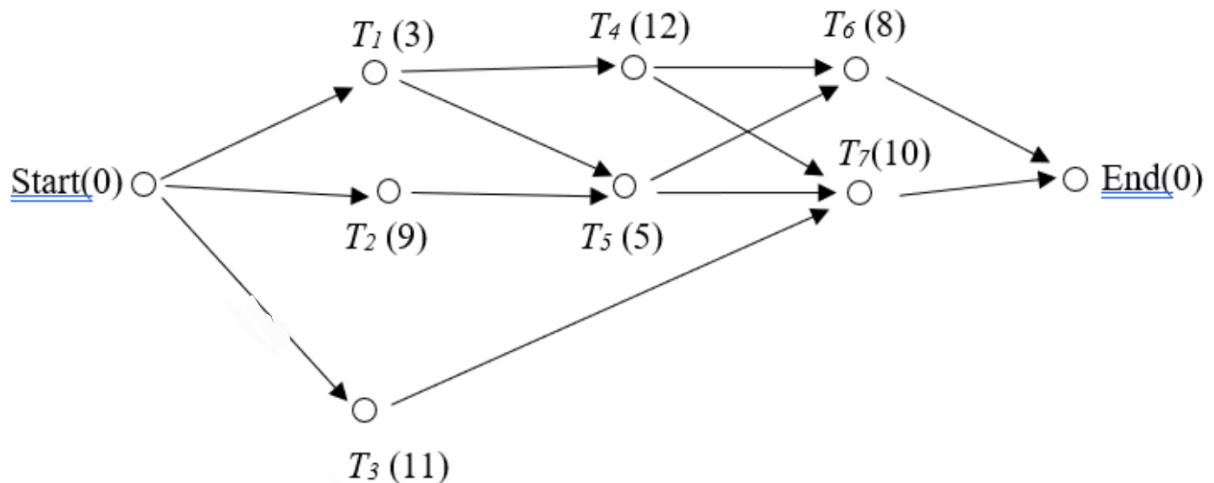


Name: _____

1. (8 points) Consider the following digraph. Use the **critical path algorithm** to create a priority list.



Priority list:

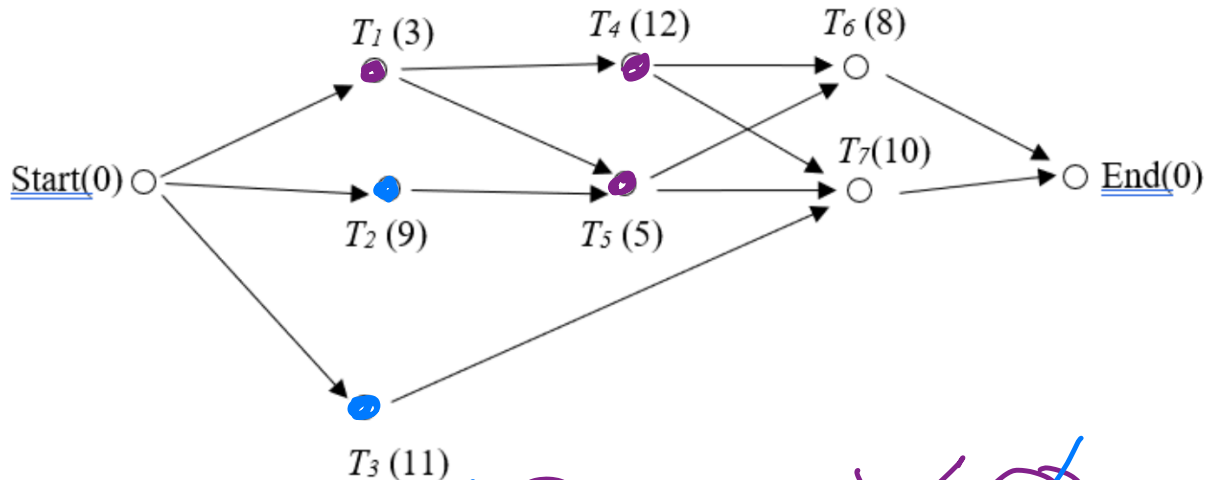
$$T_1, T_2, T_4, T_3, T_5, T_7, T_6$$

2. (5 points) Suppose that A, B are not mutually exclusive events, with $P(A) = 0.2$ and $P(B) = 0.7$ and $P(A \text{ and } B) = 0.1$. Find $P(A \text{ or } B)$.

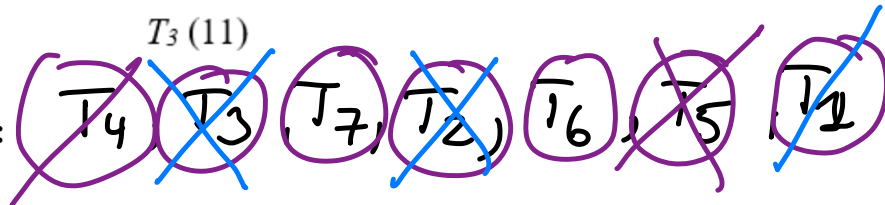
- a. 0.9
 b. 0.8
 c. 0.6
 d. 0.1

$$\begin{aligned}
 P(A \text{ or } B) &= P(A) + P(B) - P(A \text{ and } B) \\
 &= 0.2 + 0.7 - 0.1 \\
 &= 0.8
 \end{aligned}$$

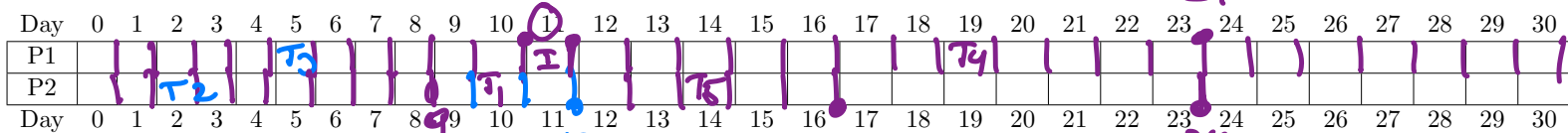
3. (20 points) Use the **decreasing time algorithm** to create a priority list for the digraph above and create an optimal schedule with two processors.



Priority List:



Schedule:



Day 0: $P_1 \rightarrow T_3$
 $P_2 \rightarrow T_2$

Day 9: T_2 done
 $P_2 \rightarrow T_1$

Day 11: T_3 ✓
 P_1 idle

Day 12: T_1 done
 T_4, T_5 av
 $P_1 \rightarrow T_4$
 $P_2 \rightarrow T_5$

Day 17: T_5 ✓
 P_2 idle

Day 24: T_4 ✓
 T_6, T_7
 $P_1 \rightarrow T_7$

Day 31 done

4. (5 points) A basketball player hits three-point shots 64% of the time. If she takes 4 shots during a game, what is the probability that she hits the first shot and misses the last three shots?

a. 0.03

b. 0.05

c. 0.5

d. 0.04

5. (5 points) If two cards are drawn at random without replacement from a standard deck, find the probability that the second card is red, given that the first card was a heart.

a. $1/13$

b. $25/52$

c. $24/51$

d. $25/51$

6. (10 points) A test is given to a group of students; the grades and gender of the students is summarized in the table below:

	A	B	C	Total
Male	8	17	10	35
Female	8	13	13	34
Total	16	30	23	69

If one student is chosen at random, determine the following probabilities.

Write your answer as fractions.

- (a) What is the probability that the chosen student is a male?

$$\frac{16}{69} = 0.231$$

- (b) What is the probability that the chosen student is a student who is female and got a C grade.

$$\frac{13}{69} = 0.188$$

- (c) What is the probability that the chosen student is a male given the student got an A.

$$\frac{8}{16} = \frac{1}{2}$$

- (d) What is the probability that the chosen student is a female given the student got an A.

$$\frac{8}{16} = \frac{1}{2}$$

7. (10 points) A card is selected at random from a standard deck. **Write your answer as fractions.**

Standard deck

2♥	2♦	2♣	2♠
3♥	3♦	3♣	3♠
4♥	4♦	4♣	4♠
5♥	5♦	5♣	5♠
6♥	6♦	6♣	6♠
7♥	7♦	7♣	7♠
8♥	8♦	8♣	8♠
9♥	9♦	9♣	9♠
10♥	10♦	10♣	10♠
J♥	J♦	J♣	J♠
Q♥	Q♦	Q♣	Q♠
K♥	K♦	K♣	K♠
A♥	A♦	A♣	A♠

2 (a) Find probability of selecting a heart. $\frac{13}{52} = \frac{1}{4}$

2 (b) Find probability of selecting the Queen of hearts. $\frac{1}{52}$

2 (c) Find the probability of selecting a club **or** an Ace. $P(\text{Club or Ace}) = \frac{13}{52} + \frac{4}{52} - \frac{1}{52} = \frac{16}{52} =$

2 (a) Find the probability of selecting a face card **or** a 2.

$$\frac{12}{52} + \frac{4}{52} = \frac{16}{52} = \frac{4}{13}$$

2 (b) Find the probability of selecting a Jack **or** a high card.

$$\frac{4}{52} + \frac{20}{52} - \frac{4}{52} = \frac{20}{52} = \frac{5}{13}$$

8. (13 points) Let A, B be events, with $P(A) = 0.4$, $P(B) = 0.6$, and $P(A|B) = 0.20$.

Calculate the following probabilities for parts a through d, and give your answer as a decimal rounded to two decimal places.

3 (a) $P(B') = 1 - 0.6 = 0.4$

2 (b) $P(A \text{ and } B) = P(B) P(A|B) = (0.6)(0.2) = 0.12$

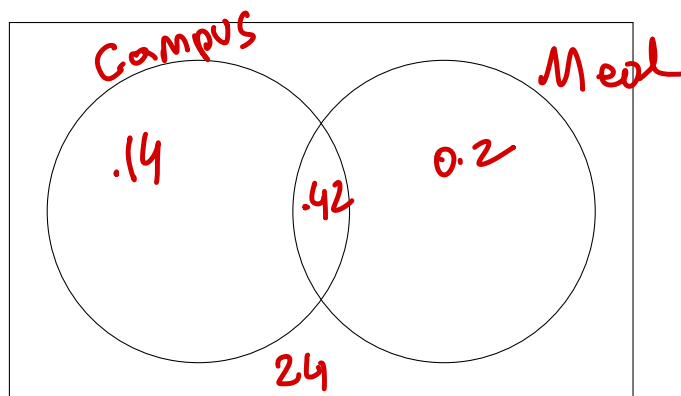
3 (c) $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B) = 0.4 + 0.6 - 0.12 = 0.88$

3 (d) $P(B|A) = \frac{P(A \text{ and } B)}{P(A)} = \frac{0.12}{0.4} = 0.3$

2 (e) Are events A and B independent? Justify your answer by showing what formula you used to decide on the answer.

NO $P(A|B) \neq P(A)$

9. (12 points) Our survey found that 56% of college students live on campus, 62% have a campus meal program, and 42% do both.



- 2 (a) What is the probability of picking a student who lives on campus but does not have a campus meal plan?

14%.

- 3 (b) What's the probability that a chosen student lives off campus and does not have a campus meal?

24%.

- 3 (c) What's the probability of picking a student who lives on campus or has a campus meal plan?

76

- 2 (d) If you randomly select 3 students, what is the probability that all 3 live on campus?

$$(.56)^3 = 0.175 \quad 17.5\%$$

- 2 (e) If you randomly select 3 students what is the probability that none have campus meal.

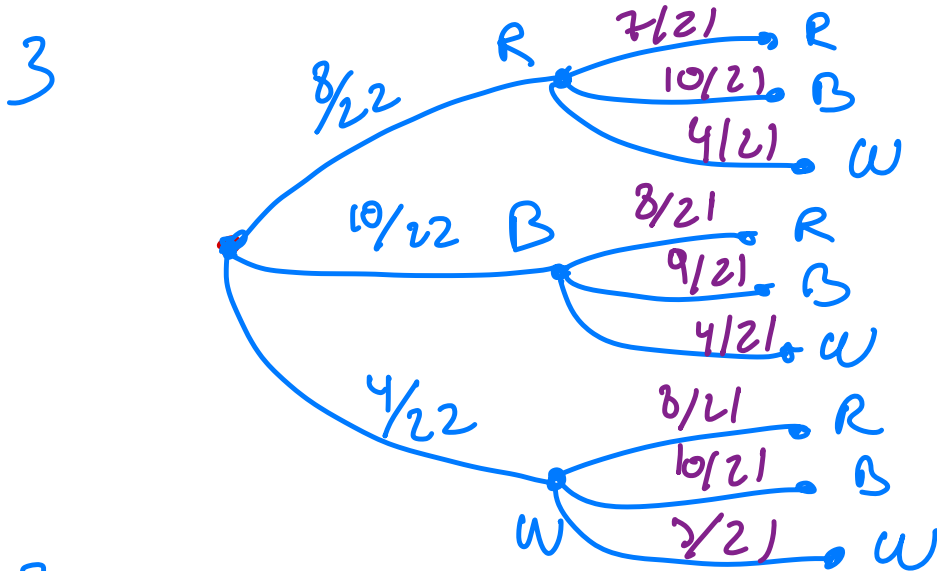
$$(.38)^3 = 0.0548 \quad 5.48\%$$

- (f) *Bonus*: If you randomly select 4 students what is the probability that at least one lives on campus.

$$1 - (.44)^4 = 0.962$$

10. (12 points) A jar contains 8 red marbles, 10 blue marbles, and 4 white marbles. If two marbles are drawn randomly from the jar without replacement, find the probability of the given event, and write your answers as fractions.

(a) First, create a tree diagram with probabilities on each possible outcome.



3 (b) The second ball is red, given that the first ball is white:

$$8/21 = 0.38$$

3 (c) The second ball is white, given that the first ball is red:

$$4/21 = 0.19$$

3 (d) Both balls are white:

$$\frac{4}{22} \cdot \frac{3}{21} = (0.18)(0.14) = 0.02$$