AIM 5002 Computational Statistics and Probability (Spring 2021)

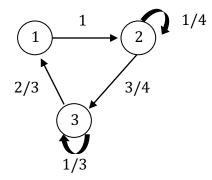
Assignment 6

	Name:	Score:	/8	
Submit your assignment at CANVAS by uploading your file. Due date: Monday, 3 rd of the May, 2021 by 11:59 PM				
1.	A machine part in the manufacturing process is and production and has different probabilities be are developed, 20% go to the pilot phase, the ot production phase. The parts in pilot either go to phase with the same probability. If there is a cri production phase, the parts go back to production phase come back to design phase to and find the steady-state probabilities (2 points).	netween three hers directly the same platical defect ion on phase. 20 correct. Dev	ee phases. If to go to the nase or produ n the part in % of the par	the paruction
2.	You are given a fair 6-sided die and play a game (A) Suppose that if you see 1, the game stops. W rolling until you end the game? Explain using	hat is the ex	pected numb	
	(B) What is the expected number of rolling until rolled numbers is 7? Use Markov chain (1 po		sum of the la	ıst two

- 3. You are playing with another person using a coin.
 - (A) Suppose that the coin is fair meaning the probability of head is equal to $\frac{1}{2}$ and probability of tail is equal to $\frac{1}{2}$. You get one point at each flipping if you see the head and loses one point if you see the tail. The flippings are independent from each other. You play continuously until either you accumulate 10,000 points or lose all your points. What is the probability of eventually accumulating the 10,000 points when you start the game with 100 points (1 point)?

(B) Suppose that the coin is unfair in that the probability of head is equal to 1/3 and probability of tail is equal to 2/3. You get one point at each flipping if you see the head and loses one point if you see the tail. The flippings are independent from each other. You play continuously until either you accumulate 10,000 points or lose all your points. What is the probability of eventually accumulating the 10,000 points when you start the game with 100 points (1 point)?

4. See the following Markov chain below. Assume that the process is in state 1 just before the first transition (2 points).



(A) What is the probability that the process will be in state 1 just after the fifth transition?

(B) Determine the expected value and variance of the number of transitions up to and including the next transition during which the process returns to state 1.