Lab 6 (Discrete Distribution)

Simulation and Modeling (CSCI 3010U)

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Due back Nov. 10, 11:59 pm

Introduction

Sample $10,000$ numbers between 1 and 10 from the distribution described below:

- Probability of getting a 1 is 12/100
- Probability of getting a 2 is 13/100
- Probability of getting a 3 is 20/100
- Probability of getting a 4 is 10/100
- Probability of getting a 5 is 6/100
- Probability of getting a 6 is 4/100
- Probability of getting a 7 is 5/100
- Probability of getting a 8 is 9/100
- Probability of getting a 9 is 20/100
- Probability of getting a 10 is 1/100

Now complete the following tasks:

- Plot the normalized histogram
- Use Chi-square test to see if the *null hypothesis* stands. Assume a significance level of 0.05. Figure 1 contains the Chi-square table.

Submission

Via Blackboard.

- Python file that includes your code for sampling $10,000$ numbers and plotting the normalized histogram.
- A pdf file that shows the work supporting your assertion whether or not the *null hypothesis* holds.

	$P(X \leq x)$							
	0.010	0.025	0.050	0.100	0.900	0.950	0.975	0.990
r	$\chi^2_{0.99}(r)$	$\chi^2_{0.975}(r)$	$\chi^2_{0.95}(r)$	$\chi^2_{0.90}(r)$	$\chi^2_{0.10}(r)$	$\chi^2_{0.05}(r)$	$\chi^2_{0.025}(r)$	$\chi^2_{0.01}(r)$
1	0.000	0.001	0.004	0.016	2.706	3.841	5.024	6.635
2	0.020	0.051	0.103	0.211	4.605	5.991	7.378	9.210
3	0.115	0.216	0.352	0.584	6.251	7.815	9.348	11.34
4	0.297	0.484	0.711	1.064	7.779	9.488	11.14	13.28
5	0.554	0.831	1.145	1.610	9.236	11.07	12.83	15.09
6	0.872	1.237	1.635	2.204	10.64	12.59	14.45	16.81
7	1.239	1.690	2.167	2.833	12.02	14.07	16.01	18.48
8	1.646	2.180	2.733	3.490	13.36	15.51	17.54	20.09
9	2.088	2.700	3.325	4.168	14.68	16.92	19.02	21.67
10	2.558	3.247	3.940	4.865	15.99	18.31	20.48	23.21

Figure 1: Chi square table