DS 1000B: Final Exam

Information Sheet

Winter 2026

When & Where

Exam Details

Date: Sunday, April 19th, 2026

Time: 10:00 AM – 1:00 PM (180 minutes)

Duration: 3 hours

Room Assignments

Please make sure to go to the correct room based on your section and last name.

Room	Section	From	To
Section 002			
AP 2001A/B	002	Abra	Dinno
FEB GYM	002	Dolbel	Zhang
Section 003			
FEB GYM	003	Abdallah	Kalverda
SJB AUD	003	Kamel	Zhu

Allowed Aids

- **Calculator:** Non-programmable, non-graphing.
- **Formula sheet and standard normal table:** Please find copies at the end of this document. Both will be provided during the exam. Do **not** bring your own.
- **Photo ID:** Please bring valid photo identification.

Approximate Weighting

Topics	Approx. % of Marks
Chapter 1, 2, 4, 5, 6	30%
Chapters 12, 13	30%
Chapters 3, 15, 16	30%
Chapters 8, 9	10%
Total	**100%**

As with the midterm, there will be **no** Python questions on the final exam.

Exam Format

The exam consists of two parts:

Section	Question Type	Weight
Part A	Multiple Choice (15 questions)	15%
Part B	Written	85%

Please see the final page of this document to view the cover page of the final exam.

The total number of parts in the written section is 37.

Preparation Tips

- **Highly recommended:** Prepare by completing the cumulative problem sets and by re-doing lecture and assignment problems under timed, exam-like conditions. Additional practice questions are available on Brightspace; these draw from past exams and other challenging problems across all sections of the course.
  Note on the practice questions: The Brightspace practice set is *not* representative of overall exam difficulty; it is designed to challenge students who want to push beyond the regular problems. The actual exam will include a range of difficulties, including questions similar to those in the cumulative problem sets and lectures.
- Attend scheduled office hours and any review sessions announced on Brightspace.
- Please see the Piazza page prior to submitting new questions. There is a good chance your question has already been answered there.

Office Hours

Name	Date	Time	Location
Pavel	April 14	12:00 – 1:00 PM	Teams
Marieke	April 15	11:00 AM – 12:00 PM	Zoom
Chen	April 16	1:00 – 3:00 PM	WSC 250
Jacquelyn	April 16	3:00 – 5:00 PM	WSC 250
Qiduo	April 17	1:00 – 3:00 PM	WSC 250
Jie	April 17	3:00 – 5:00 PM	WSC 250
Barry	April 18	3:00 – 5:00 PM	WSC 250

Important Reminders

Please read carefully:

- **Do not write on or near the barcodes** at the top of exam pages. This renders them unscannable and may result in zero marks for those questions.
- **Do not use coloured pens, markers, or highlighters**. They do not scan properly.
- Students with Accessible Education accommodations should confirm their arrangements with AE directly well in advance of the exam. The deadline of 10 business days prior to the exam is strictly enforced by AE (they do not have additional spacing).

Good luck with your preparation!

— Marieke Mur & Pavel Shuldiner

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Standard Normal Table

z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	.5000	.5040	.5080	.5120	.5160	.5199	.5239	.5279	.5319	.5359
0.1	.5398	.5438	.5478	.5517	.5557	.5596	.5636	.5675	.5714	.5753
0.2	.5793	.5832	.5871	.5910	.5948	.5987	.6026	.6064	.6103	.6141
0.3	.6179	.6217	.6255	.6293	.6331	.6368	.6406	.6443	.6480	.6517
0.4	.6554	.6591	.6628	.6664	.6700	.6736	.6772	.6808	.6844	.6879
0.5	.6915	.6950	.6985	.7019	.7054	.7088	.7123	.7157	.7190	.7224
0.6	.7257	.7291	.7324	.7357	.7389	.7422	.7454	.7486	.7517	.7549
0.7	.7580	.7611	.7642	.7673	.7704	.7734	.7764	.7794	.7823	.7852
0.8	.7881	.7910	.7939	.7967	.7995	.8023	.8051	.8078	.8106	.8133
0.9	.8159	.8186	.8212	.8238	.8264	.8289	.8315	.8340	.8365	.8389
1.0	.8413	.8438	.8461	.8485	.8508	.8531	.8554	.8577	.8599	.8621
1.1	.8643	.8665	.8686	.8708	.8729	.8749	.8770	.8790	.8810	.8830
1.2	.8849	.8869	.8888	.8907	.8925	.8944	.8962	.8980	.8997	.9015
1.3	.9032	.9049	.9066	.9082	.9099	.9115	.9131	.9147	.9162	.9177
1.4	.9192	.9207	.9222	.9236	.9251	.9265	.9279	.9292	.9306	.9319
1.5	.9332	.9345	.9357	.9370	.9382	.9394	.9406	.9418	.9429	.9441
1.6	.9452	.9463	.9474	.9484	.9495	.9505	.9515	.9525	.9535	.9545
1.7	.9554	.9564	.9573	.9582	.9591	.9599	.9608	.9616	.9625	.9633
1.8	.9641	.9649	.9656	.9664	.9671	.9678	.9686	.9693	.9699	.9706
1.9	.9713	.9719	.9726	.9732	.9738	.9744	.9750	.9756	.9761	.9767
2.0	.9772	.9778	.9783	.9788	.9793	.9798	.9803	.9808	.9812	.9817
2.1	.9821	.9826	.9830	.9834	.9838	.9842	.9846	.9850	.9854	.9857
2.2	.9861	.9864	.9868	.9871	.9875	.9878	.9881	.9884	.9887	.9890
2.3	.9893	.9896	.9898	.9901	.9904	.9906	.9909	.9911	.9913	.9916
2.4	.9918	.9920	.9922	.9925	.9927	.9929	.9931	.9932	.9934	.9936
2.5	.9938	.9940	.9941	.9943	.9945	.9946	.9948	.9949	.9951	.9952
2.6	.9953	.9955	.9956	.9957	.9959	.9960	.9961	.9962	.9963	.9964
2.7	.9965	.9966	.9967	.9968	.9969	.9970	.9971	.9972	.9973	.9974
2.8	.9974	.9975	.9976	.9977	.9977	.9978	.9979	.9979	.9980	.9981
2.9	.9981	.9982	.9982	.9983	.9984	.9984	.9985	.9985	.9986	.9986
3.0	.9987	.9987	.9987	.9988	.9988	.9989	.9989	.9989	.9990	.9990
3.1	.9990	.9991	.9991	.9991	.9992	.9992	.9992	.9992	.9993	.9993
3.2	.9993	.9993	.9994	.9994	.9994	.9994	.9994	.9995	.9995	.9995
3.3	.9995	.9995	.9995	.9996	.9996	.9996	.9996	.9996	.9996	.9997
3.4	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9998

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Formula Sheet

Descriptive Statistics

Mean:

$$\bar{x} = \frac{\sum_{i=1}^{n} x_i}{n}$$

Variance:

$$s^2 = \frac{\sum_{i=1}^{n} (x_i - \bar{x})^2}{n-1}$$

Standard Deviation: $s = \sqrt{s^2}$

Interquartile Range: $\text{IQR} = Q_3 - Q_1$

Outlier Fences (1.5×IQR Rule):

$$Q_1 - 1.5 \times \text{IQR} \quad \text{and} \quad Q_3 + 1.5 \times \text{IQR}$$

Z-Scores

Z-Score:

$$z = \frac{x - \mu}{\sigma}$$

Correlation

Correlation Coefficient:

$$r = \frac{1}{n-1} \sum_{i=1}^{n} \left(\frac{x_i - \bar{x}}{s_x} \right) \left(\frac{y_i - \bar{y}}{s_y} \right)$$

Linear Regression

Regression Line: $\hat{y} = a + bx$

Slope: $b = r \cdot \dfrac{s_y}{s_x}$

Intercept: $a = \bar{y} - b\bar{x}$

Residual: $e = y - \hat{y} = \text{observed} - \text{predicted}$

Coefficient of Determination: $R^2 = r^2$

Contingency Tables

Proportion / Risk:

$$\frac{\text{Number with outcome}}{\text{Total}}$$

Odds:

$$\frac{\text{Number with outcome}}{\text{Number without outcome}}$$

Relative Risk (RR):

$$\frac{\text{Risk in group 1}}{\text{Risk in group 2}}$$

Odds Ratio (OR):

$$\frac{\text{Odds in group 1}}{\text{Odds in group 2}}$$

Probability Rules

Complement Rule:

$$P(A^c) = 1 - P(A)$$

Addition Rule:

$$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$$

Conditional Probability

Conditional Probability:

$$P(A \mid B) = \frac{P(A \text{ and } B)}{P(B)}$$

Multiplication Rule:

$$P(A \text{ and } B) = P(B) \times P(A \mid B)$$

Bayes' Rule:

$$P(B \mid A) = \frac{P(A \mid B) P(B)}{P(A)}$$

Law of Total Probability:

$$P(A) = \sum_{i=1}^{k} P(A \mid B_i) P(B_i),$$

where $B_1, B_2, \ldots, B_k$ partition the sample space

Confidence Intervals

Margin of Error:

$$\text{MOE} = z^* \times \frac{\sigma}{\sqrt{n}}$$

Do NOT write in the area above this line.

Final Exam

Course: DS 1000B Winter 2026

Sections: 002, 003

Date: April 19th, 2026

10:00 AM – 1:00 PM (180 minutes)

Instructors:

Marieke Mur

Pavel Shuldiner

Allowed aids:

A calculator (non-programmable, non-graphing)

Formula sheet (provided).

Standard Normal Table (provided).

Full Name (print) *(e.g. Tom Marvolo Riddle):*	
Western ID *(e.g. baldemort13):*	
Student Number *(e.g. 251123456):*	

1. Legibly **print** your Western User ID, full name, and student number in the spaces provided above.
2. Do **not** detach the pages of the exam. You may ask for scrap paper if needed.
3. The space at the top of each page is reserved for the scanner. Do not write on or near the barcode.
4. The exam has 24 pages. The last three pages may be used for additional workspace or scrap paper.

Section	**Marks**
Multiple Choice	15
Miscellaneous	9
Section 1	4
Section 2	6
Section 3	7
Section 4	9
Section 5	10
Section 6	11
Section 7	12
Section 8	17
Total	**100**