

# FIN270 FINAL PROJECT

Siying Chen

# Lululemon Athletica Inc. (LULU)

- **Founded:** 1998, in Vancouver, Canada.
- **Industry:** Athletic Apparel and Lifestyle Retail.
- **Target Customers:** Fitness enthusiasts/  
High-income Consumers



	Aug-2020	Nov-2020	Jan-2021	May-2021	Aug-2021	Oct-2021	Jan-2022	May-2022	Jul-2022	Oct-2022	Jan-2023	Apr-2023	Jul-2023	Oct-2023	Jan-2024	Apr-2024	Jul-2024
<b>GROSS PROFIT</b>																	
Cost of Revenue	(413)	(490)	(717)	(526)	(608)	(621)	(893)	(743)	(813)	(818)	(1 244)	(850)	(911)	(948)	(1 302)	(934)	(959)
Gross Profit	490	627	1 013	700	843	829	1 236	870	1 055	1 039	1 528	1 151	1 299	1 257	1 903	1 275	1 412
	+46%	+28%	+61%	-31%	+20%	-2%	+49%	-30%	+21%	-2%	+47%	-25%	+13%	-3%	+51%	-33%	+11%
<b>OPERATING INCOME</b>																	
Operating Expenses	(354)	(414)	(547)	(499)	(544)	(547)	(644)	(610)	(664)	(686)	(805)	(749)	(819)	(844)	(990)	(842)	(872)
Selling, General & Administr...	(353)	(412)	(545)	(497)	(541)	(545)	(642)	(608)	(662)	(684)	(803)	(748)	(817)	(843)	(990)	(842)	(872)
Depreciation & Amortization	(1)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(1)	0	0	0
Operating Income	136	213	466	201	299	282	592	260	391	352	722	401	479	413	914	433	540
	+318%	+57%	+118%	-57%	+48%	-6%	+110%	-56%	+50%	-10%	+105%	-44%	+19%	-14%	+121%	-53%	+25%
<b>PRE-TAX INCOME</b>																	
Interest Income Expense	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Non-Recurring Items	(11)	(9)	(8)	(8)	(8)	(24)	(1)	0	10	0	(408)	0	0	(75)	0	0	0
Total Other Income	(0)	(1)	(1)	0	0	0	0	(0)	0	0	4	8	7	10	18	23	18
Pre-Tax Income	124	204	457	194	291	258	591	260	401	353	318	409	487	348	932	456	558
	+266%	+65%	+124%	-58%	+50%	-11%	+129%	-56%	+54%	-12%	-10%	+29%	+19%	-28%	+168%	-51%	+22%
<b>NET INCOME</b>																	
Tax Provision	(37)	(61)	(127)	(49)	(83)	(70)	(156)	(70)	(112)	(97)	(198)	(119)	(145)	(99)	(262)	(135)	(165)
Income from Continuing Operation...	87	144	330	145	208	188	435	190	290	255	120	290	342	249	669	321	393
Income to Minority Interest	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Net Income (Common)	87	144	330	145	208	188	435	190	290	255	120	290	342	249	669	321	393
	+203%	+65%	+130%	-56%	+44%	-10%	+131%	-56%	+52%	-12%	-53%	+143%	+18%	-27%	+169%	-52%	+22%
EPS (Diluted)	0.66	1.1	2.52	1.11	1.59	1.44	3.36	1.48	2.26	2	0.94	2.28	2.68	1.96	5.29	2.54	3.15
	+200%	+67%	+129%	-56%	+43%	-9%	+133%	-56%	+53%	-12%	-53%	+143%	+18%	-27%	+170%	-52%	+24%

# Earning Surprise (Positive)

## Research Analysis

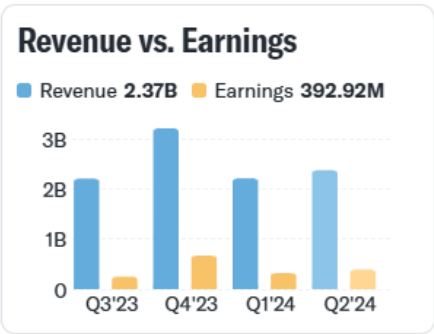


Fig 1: Yahoo Finance

## Earnings Surprise (EPS) - Actual vs Consensus

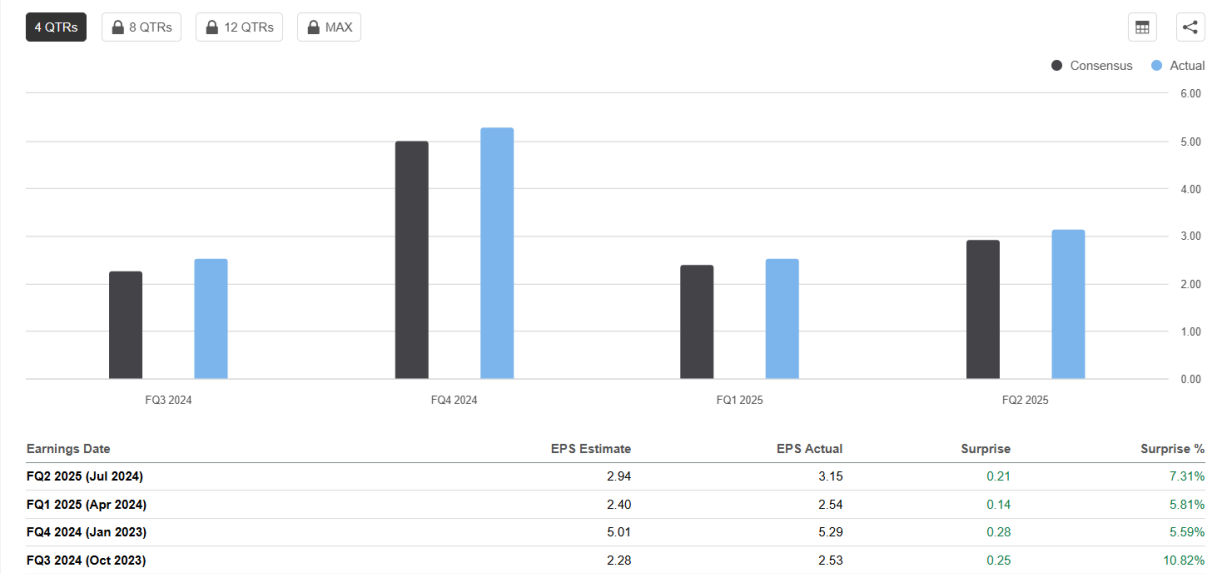


Fig 2: Seeking Alpha

# Option Strategy: Uneven Ratio Call Spread

Earning Date	Rise/Drop next Day	Price	Price next day	change
08/29/2024	Horizontal			
06/05/2024	Rise			
03/21/2024	Drop			
<b>12/07/2023</b>	<b>Rise</b>	<b>464.67</b>	<b>489.64</b>	<b>5.37%</b>
08/31/2023	Rise			
06/01/2023	Rise			
03/28/2023	Rise			
<b>12/08/2022</b>	<b>Drop</b>	<b>374.51</b>	<b>326.39</b>	<b>-12.85%</b>
09/01/2022	Rise			
06/02/2022	Rise			
03/29/2022	Rise			
<b>12/09/2021</b>	<b>Drop</b>	<b>416.92</b>	<b>409.58</b>	<b>-1.76%</b>
09/08/2021	Rise			
06/03/2021	Rise			
03/30/2021	Horizontal			
<b>12/10/2020</b>	<b>Drop</b>	<b>369.07</b>	<b>344.32</b>	<b>-6.71%</b>
09/08/2020	Drop			
06/11/2020	Drop			
03/26/2020	Drop			
<b>12/11/2019</b>	<b>Drop</b>	<b>233.19</b>	<b>224.47</b>	<b>-3.74%</b>
<b>12/06/2018</b>	<b>Drop</b>	<b>131.44</b>	<b>113.87</b>	<b>-13.37%</b>
<b>12/06/2017</b>	<b>Rise</b>	<b>67.66</b>	<b>72.01</b>	<b>6.43%</b>

**Dec 2021:** Lower Mirror sales guidance, high market expectations

**Dec 2022:** Rising inventory levels, declining profit margins, conservative holiday guidance

**Dec 2023:** Increase of international sales, moderate forward guidance

**Dec 2024 (Prediction):**

- 7% Year-Over-Year revenue and net income growth
- Drop since this year
- Strong Black Friday sales
- Potential risks from lack of product innovation
- Conservative guidance

# Option Strategy: Uneven Ratio Call Spread

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Date	340_Call_Price	360_Call_Price	Long_Call_Value	Short_Call_Value	Net_Value		P&L		
2024/12/4	14.85	7.35	2970	735	2235	D2-E2	239%	((F3/F2)-1)	
2024/12/6	58.2	40.55	11640	4055	7585				

**2 long call contracts: \$340**

**1 short call contract: \$360**

**Profit: \$239%**

## Part 2: Pricing Option

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- Black Scholes Model
- Binomial tree model

# Black Scholes Model

- Trade Date: Dec 4, 2024
- Maturity Date: Dec 27, 2024
- Closing Price (S0): 340.66 USD
- Strike Price (K): 360 USD
- **Annualized Volatility ( $\sigma$ ): 50.52%**
- 1-month U.S. Treasury bill yield (rf): 4.76%  
(as of Nov 29, 2024)
- Time(T): 23/252

- **Option Price: 21.74 USD**

LULU / Option Chain

## lululemon athletica inc. Common Stock (LULU) Option Chain

Expiration Dates		Option		Strategy		Moneyyness		Type					
December 2024 ▾		Composite ▾		Calls & Puts ▾		Near the Money ▾		All (Types) ▾					
Calls							Puts						
Exp. Date	Last	Change	Bid	Ask	Volume	Open Int.	Strike	Last	Change	Bid	Ask	Volume	Open Int.
December 27, 2024													
Dec 27	38.00	+4.24 ▲	37.60	41.80	10	32	310.00	6.16	-1.01 ▼	5.60	10.65	8	23
Dec 27	30.55	--	34.20	36.35	--	22	315.00	8.28	-0.12 ▼	6.50	7.45	1	14
Dec 27	31.00	+3.77 ▲	31.75	33.55	4	18	320.00	9.75	-0.70 ▼	8.55	12.80	9	23
Dec 27	28.06	+1.86 ▲	28.55	34.00	1	34	325.00	11.73	--	9.45	11.50	--	35
Dec 27	26.00	+1.10 ▲	24.40	27.70	22	34	330.00	13.00	-3.20 ▼	8.00	15.35	1	24
Dec 27	21.60	+0.95 ▲	22.85	26.75	15	36	335.00	16.70	+0.75 ▲	14.50	17.25	1	14
Dec 27	19.91	+1.19 ▲	16.00	21.00	12	51	340.00	17.94	-1.66 ▼	16.90	20.25	16	12
Dec 27	18.30	-0.05 ▼	13.30	18.65	10	35	345.00	21.40	-3.70 ▼	19.55	20.25	1	3
Dec 27	16.11	+1.76 ▲	15.70	16.45	38	46	350.00	24.28	--	19.00	27.75	--	2
Dec 27	13.61	+0.95 ▲	13.60	19.00	7	35	355.00	26.50	-3.85 ▼	25.10	31.00	19	2
Dec 27	11.70	+0.35 ▲	11.80	14.25	15	37	360.00	48.65	--	28.40	34.00	--	30

```

1 print(S0, K, r, T, annual_vol_pandas)
2 option_price_bsm, N_d1, N_d2 = black_scholes(S0 = S0, K = K, r = r, T= T, sigma = annual_vol_pandas, option_type = 'call')
3 print(f"Estimated call option price based on Black Scholes Model: {option_price_bsm:.2f}")

[165] ✓ 0.0s Python
... 340.6600036621094 340 0.0476 0.09126984126984126 0.36489304857659116
Estimated call option price based on Black Scholes Model: 16.02

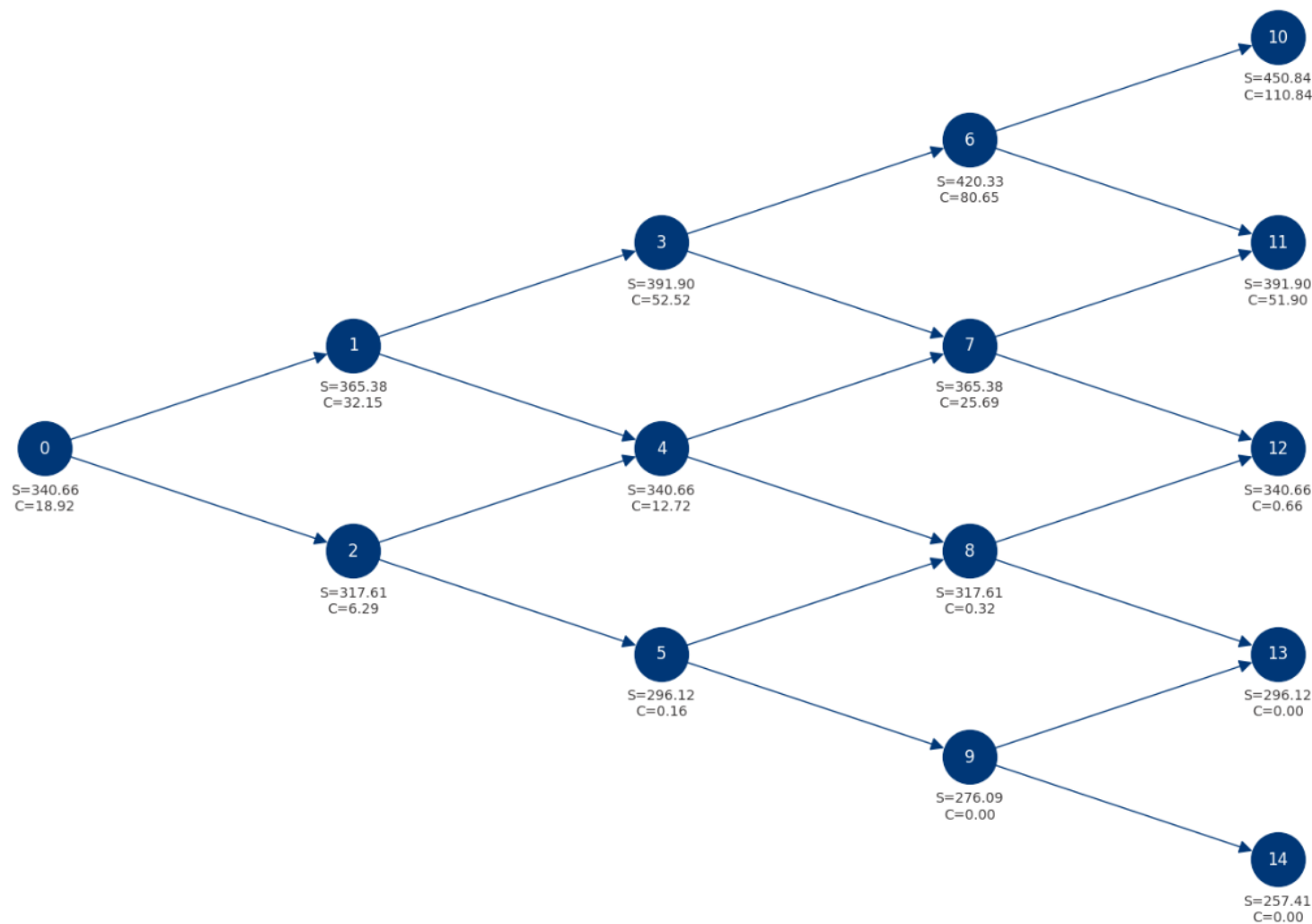
```



Binary Tree for Option Pricing ( $S_0 = 340.66$ )

# Binomial Tree Model

- Trade Date: Dec 4, 2024
- Maturity Date: Dec 27, 2024
- Closing Price ( $S_0$ ): 340.66 USD
- **Annualized Volatility ( $\sigma$ ): 50.52%**
- Upward price multiplier( $u$ ): 1.05
- Downward price multiplier( $d$ ): 0.95
- Discount Factor: 0.9991
- Time( $T$ ): 23/252
- $N$ : 4
- **Option Price: 18.92 USD**



## Part 2: Pricing Option

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Difference:

- Time Value
- Implied volatility increased near earning day

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- Estimated call option price based on Black Scholes Model(implied volatility): 21.00  
- Estimated call option price based on Binomial Tree Model(implied volatility): 18.28
```

- Risk free rate
- BTM > BSM ? Daily step result

```
Comparison of Models:  
- Estimated call option price based on Black Scholes Model: 21.74  
- Estimated call option price based on Binomial Tree Model: 21.96
```

# Reference

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<https://seekingalpha.com/symbol/LULU/earnings/eps-surprise-summary?period=quarterly>

<https://finance.yahoo.com/quote/LULU/analysis/>

<https://www.alphaspread.com/security/nasdaq/lulu/financials/income-statement>

[https://www.investopedia.com/what-wall-street-analysts-think-lululemon-stock-earnings-8753898?utm\\_source=chatgpt.com](https://www.investopedia.com/what-wall-street-analysts-think-lululemon-stock-earnings-8753898?utm_source=chatgpt.com)

THANK YOU

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# Dec 4th

- Closing Price: 342.27 USD

LULU / Option Chain

lululemon athletica inc. Common Stock (LULU) Option Chain

Expiration Dates	Option	Strategy	Moneyness				Type						
December 2024 ▾	Composite ▾	Calls & Puts ▾	Near the Money ▾				All (Types) ▾						
Calls							Puts						
Exp. Date	Last	Change	Bid	Ask	Volume	Open Int.	Strike	Last	Change	Bid	Ask	Volume	Open Int.
December 6, 2024													
Dec 6	36.91	+2.96 ▲	34.45	35.50	3	147	307.50	3.33	+0.13 ▲	3.10	3.35	79	111
Dec 6	33.74	-1.09 ▼	32.55	33.95	4	100	310.00	3.75	-0.13 ▼	3.65	3.90	120	351
Dec 6	31.40	+0.85 ▲	30.70	31.50	1	28	312.50	4.37	+0.07 ▲	4.20	4.50	38	345
Dec 6	30.01	-1.39 ▼	28.60	30.65	13	352	315.00	5.01	-0.24 ▼	5.00	5.20	91	394
Dec 6	23.21	--	27.10	28.35	--	60	317.50	5.85	+0.22 ▲	5.50	5.90	73	234
Dec 6	27.09	-0.51 ▼	24.95	26.10	15	183	320.00	6.60	+0.28 ▲	6.35	6.75	145	525
Dec 6	26.00	+1.00 ▲	23.60	25.70	21	100	322.50	7.38	--	7.25	7.60	32	230
Dec 6	22.00	-0.01 ▼	22.20	22.95	22	238	325.00	8.64	+0.54 ▲	8.15	8.55	32	220
Dec 6	21.75	--	20.45	22.30	--	53	327.50	8.90	-1.10 ▼	9.10	9.55	10	74
Dec 6	18.93	-2.77 ▼	19.25	20.10	63	337	330.00	10.64	+0.29 ▲	10.25	10.65	44	141
Dec 6	20.00	--	17.95	19.50	13	123	332.50	11.79	+0.74 ▲	11.30	11.80	7	183
Dec 6	16.74	-1.56 ▼	16.70	17.35	98	309	335.00	12.93	+0.53 ▲	12.50	13.05	31	137
Dec 6	15.60	-1.25 ▼	15.50	16.50	65	100	337.50	14.22	+0.76 ▲	13.75	14.30	75	30
Dec 6	14.50	-0.98 ▼	14.30	14.85	232	741	340.00	15.53	+0.63 ▲	15.05	15.60	61	79
Dec 6	13.30	-1.21 ▼	13.20	13.75	19	46	342.50	17.05	+1.08 ▲	16.45	17.00	11	10
Dec 6	12.38	-0.97 ▼	12.15	12.70	64	249	345.00	18.00	+0.30 ▲	17.85	18.50	12	9
Dec 6	11.19	-1.36 ▼	11.15	11.70	27	341	347.50	18.72	--	19.15	20.00	2	--
Dec 6	10.35	-1.15 ▼	10.20	10.65	140	790	350.00	21.25	+0.79 ▲	20.90	21.65	3	8
Dec 6	8.52	-1.13 ▼	8.50	8.85	74	390	355.00	24.15	-4.54 ▼	23.95	24.90	1	3
Dec 6	7.13	-1.07 ▼	7.00	7.35	389	485	360.00	32.65	--	27.40	28.55	--	2
Dec 6	5.65	-0.85 ▼	5.70	5.90	114	678	365.00	30.50	--	31.00	32.30	--	11
Dec 6	4.65	-0.85 ▼	4.60	4.85	73	475	370.00	--	--	35.00	36.20	--	--

# Dec 6th

- Closing Price: 399.6USD

Dec 6	79.56	+54.66 ▲	69.75	76.00	18	54	327.50	--	--	--	--	--	--
Dec 6	71.69	+48.09 ▲	67.25	71.55	177	353	330.00	--	--	--	--	--	--
Dec 6	67.98	+45.26 ▲	64.75	71.00	41	123	332.50	--	--	--	--	--	--
Dec 6	64.75	+43.97 ▲	62.15	66.50	76	281	335.00	--	--	--	--	--	--
Dec 6	62.68	+42.98 ▲	59.65	65.95	33	140	337.50	--	--	--	--	--	--
Dec 6	59.00	+41.15 ▲	58.20	60.90	399	786	340.00	--	--	--	--	--	--
Dec 6	57.07	+39.16 ▲	55.95	58.50	234	171	342.50	--	--	--	--	--	--
Dec 6	54.53	+38.73 ▲	53.85	55.50	493	680	345.00	--	--	--	--	--	--
Dec 6	52.33	+36.33 ▲	51.25	52.90	185	669	347.50	--	--	--	--	--	--
Dec 6	50.35	+36.69 ▲	48.75	50.35	674	1162	350.00	--	--	--	--	--	--
Dec 6	47.17	+35.68 ▲	43.95	45.35	384	650	355.00	--	--	--	--	--	--
Dec 6	39.00	+29.45 ▲	39.25	40.55	714	1169	360.00	--	--	--	--	--	--
Dec 6	35.15	+27.15 ▲	32.55	35.15	685	1421	365.00	--	--	--	--	--	--
Dec 6	30.14	+23.69 ▲	29.05	30.25	1222	1466	370.00	--	--	--	--	--	--
Dec 6	24.63	+19.37 ▲	24.25	26.70	1101	1447	375.00	--	--	--	--	--	--

LAST TRADE: \$399.6 (AS OF DEC 6, 2024)