Parameter Input:

```
r=0.01
intramonth_charge_corn=125
intramonth_charge_wheat=275
intercommodity_credit_rate=.55
```

Source:
https://www.cmegroup.com/trading/agricultural/grain-and-oilseed/corn_performance_bonds.html?marginsTab=INTER#clearingCode=C&sector=AGRICULTURE&exchange=CBT&pageNumber=1

Days Calculation Rules:
Futures maturity at 15th, options maturity at the last business day.

Test Case #1: All Futures

SPAN INPUT

CBT C Future 201909	2
CBT C Future 201912	-1
CBT W Future 201909	1
CBT W Future 201912	-2

PYTHON INPUT

```
Position_1=[2,'Corn','F','19-Sep']
Position_2=[-1,'Corn','F','19-Dec']
Position_3=[1,'Wheat','F','19-Sep']
Posotion_4=[-2,'Wheat','F','19-Dec']
```

SPAN OUTPUT:

Maintenance Requirements

SPAN Risk:	1,502
- Available Net Option:	0
= Total Requirement:	1,502

SPAN Risk: 1502

Exch Cmplx	Comb Comm	PB Class	Maint/ Init	Tier #	Intercom Credit	Delta Remaining	Delta Original	Risk Scan	Risk Time	Risk Vol	Risk Price	Risk WPR	Vega Tier Risk	Vega Remaining Tier Risk	Inter Vol Credit
CME															
	C														
		CORE	MNT	0	550.00	0.0000	1.0000	1,000.00	0.00	0.00	1,000.00	1,000.00	0.00	0.00	0.00
		CORE	MNT	1	0.00	0.0000	2.0000	2,000.00	0.00	0.00	2,000.00	1,000.00	0.00	0.00	0.00
		CORE	MNT	2	0.00	0.0000	-1.0000	1,000.00	0.00	0.00	1,000.00	1,000.00	0.00	0.00	0.00
	W														
		CORE	MNT	0	798.00	0.0000	-1.0000	1,450.00	0.00	0.00	1,450.00	1,450.00	0.00	0.00	0.00

Corn: Scan_risk: 1000, WPR:1000, Intercommodity_Credit: 550
Wheat: Scan_risk: 1450, WPR: 1450, Intercommodity_Credit: 798

CME										
	C									
		net	CORE	MNT	125.00	0	2.0000	1.0000	0.0000	0.0000
		net	CORE	MNT	125.00	1	2.0000	0.0000	0.0000	0.0000
		net	CORE	MNT	125.00	2	0.0000	1.0000	0.0000	0.0000
	W									
		net	CORE	MNT	275.00	0	1.0000	2.0000	0.0000	0.0000
		net	CORE	MNT	275.00	1	1.0000	0.0000	0.0000	0.0000
		net	CORE	MNT	275.00	2	0.0000	2.0000	0.0000	0.0000

Corn: Intramonth_Charge: 125
Wheat: Intramonth_Charge: 275

PYTHON OUTPUT:

```
Scan risk of Corn is 1000.0
Scan risk of Wheat is 1450.0
Delta of position_1 is 2.0
Delta of position_2 is -1.0
Delta of position_3 is 1.0
Delta of position_4 is -2.0
Intramonth_charges_corn is 125.0
Intramonth_charges_wheat is 275.0
the active senerio of corn is 13 and the pair is 14
time_risk of corn is 0.0
vol_risk of corn is 0.0
WPR of corn is 1000.0
intercommodity_credit of corn is 550.0
the active senerio of wheat is 11 and the pair is 12
time_risk of wheat is 0.0
vol_risk of wheat is 0.0
WPR of wheat is 1450.0
intercommodity_credit of wheat is 797.5
Intercommodity_credit is 1347.5
MARGIN is 1502.5
```

Test Case #3: Futures and Options

SPAN INPUT

Contract	Net
CBT C Future 201909	2
CBT W Future 201912	-2
CBT C 201910 Call at 4.00 on CBT C Future 201912	-1
CBT W 201909 Call at 4.90 on CBT W Future 201909	1

PYTHON INPUT

```
Position_1=[2,'Corn','F','19-Sep']
Position_2=[-1,'Corn','C','19-Oct','19-Dec',4.00]
Position_3=[1,'Wheat','C','19-Sep','19-Sep',4.90]
Posotion_4=[-2,'Wheat','F','19-Dec']
```

SPAN OUTPUT:

SPAN Risk:	2,376

SPAN Risk: 2376

Exch Cmplx	Comb Comm	Req Type	PB Class	Maint/ Init	Intracom Charge	Tier #	Original Delta Long	Original Delta Short	Remaining Delta Long	Remaining Delta Short
CME										
	C									
		net	CORE	MNT	69.00	0	2.0000	0.5555	0.0000	0.0000
		net	CORE	MNT	69.00	1	2.0000	0.0000	0.0000	0.0000
		net	CORE	MNT	69.00	2	0.0000	0.5555	0.0000	0.0000
	W									
		net	CORE	MNT	105.00	0	0.3814	2.0000	0.0000	0.1741
		net	CORE	MNT	105.00	1	0.3814	0.0000	0.0000	0.0000
		net	CORE	MNT	105.00	2	0.0000	2.0000	0.0000	0.1741

Corn: Intramonth_Charge: 69
Wheat: Intramonth_Charge: 105

Exch Cmplx	Comb Comm	PB Class	Maint/ Init	Tier #	Intercom Credit	Delta Remaining	Delta Original	Risk Scan	Risk Time	Risk Vol	Risk Price	Risk WPR	Vega Tier Risk	Vega Remaining Tier Risk	Inter Vol Credit
CME															
	C														
		CORE	MNT	0	794.00	0.0000	1.4445	1,733.00	-8.00	0.00	1,741.00	1,000.00	0.00	0.00	0.00
		CORE	MNT	1	0.00	0.0000	2.0000	2,000.00	0.00	0.00	2,000.00	1,000.00	0.00	0.00	0.00
		CORE	MNT	2	0.00	0.0000	-0.5555	802.00	-8.00	163.00	647.00	1,000.00	0.00	0.00	0.00
	W														
		CORE	MNT	0	1,056.00	-0.1741	-1.6186	2,319.00	12.00	-156.00	2,151.00	1,329.00	-156.00	-156.00	0.00

Corn: Scan_risk: 1733, WPR:1000, Intercommodity_Credit: 794
Wheat: Scan_risk: 2319, WPR: 1450, Intercommodity_Credit: 1059

PYTHON OUTPUT:

```
Scan risk of Corn is 1726.87
Scan risk of Wheat is 2308.93
Delta of position_1 is 2.0
Delta of position_2 is -0.55
Delta of position_3 is 0.36
Delta of position_4 is -2.0
Intramonth_charges_corn is 69.34
Intramonth_charges_wheat is 100.06
the active senerio of corn is 13 and the pair is 14
time_risk of corn is 0.03
vol_risk of corn is -164.89
WPR of corn is 1561.95
intercommodity_credit of corn is 859.07
the active senerio of wheat is 12 and the pair is 11
time_risk of wheat is -3.2
vol_risk of wheat is -158.54
WPR of wheat is 2153.59
intercommodity_credit of wheat is 1184.47
Intercommodity_credit is 2043.54
MARGIN is 2161.65
```
