A	В	С	D	E	F	G	Н	I	J	K	L	MN
	MA	TLAB P	roject (#2) - Metallic	: Failure A	nalvsis							
3			ace Structural Analysis, Uni			go (Copyright	: J.B. Kosmati	ka, 2020)				
5		Version:	Winter, 2020 (v1)									
6									-			
7	Pi	roject Title:	Reader Example, Volume 1,	page 240 (4.50),	2-D Stress Failu	re Analysis, 70	75-T6 Al	1	1 8			
8						*******************************						
9		Variable	Description	Value	Units				Units Re			
10		ilnput	Input Units	1	1 = US, 2 = SI	***************************************			US	SI		
11		iOutput	Output Units	1	1 = US, 2 = SI			σ, τ	$10^3 lb/in^2$	МРа		
12		ioption	Analysis Option	1	1 = Stress, 2 =	Strain		<i>E</i> , <i>G</i>	10 ⁶ lb/in ²	GPa	_	
13 14		Material Pr	onarties			***************************************		****************************				
15		Variable	Description	A-Basis	B-Basis	Units						
16		Е	Young's Modulus	10.3	10.3	Msi						
17		G	Shear Modulus	3.9	3.9	Msi						
18		$\sigma_{\scriptscriptstyle {\it yT}}$	Yield strength - tension	68	70	Ksi						
19		$\sigma_{\it uT}$	Ultimate strength - tension	78	80	Ksi						
20		$\sigma_{ extit{yC}}$	Yield strength - compressio	-70	-73	Ksi			- I - I - I - I - I - I - I - I - I - I			
21		$\sigma_{\it uC}$	Uultimate strength - compr	-78	-80	Ksi						
22		τ_y	Yield strength - shear	35.25	35.25	Ksi						
23		τ_u	Ultimate strength - shear	46	48	Ksi						
24 25		Safety Facto										
26		Variable	Description	Value	Units							
27		SF _v	Safety Factor - yield	1.1	1						-	
28		SF ,,	Safety Factor - ultimate	1.5	1							
29			,									
30												
31	Х	Option 1:	Applied Stress State		,							
32		A !!! C+	644-									
33 34		Applied Stre Variable	Description	Value	Units							
35		σ _{xx}	Stress (σ_{xx})	25	Ksi						-	
36		σ_{yy}	Stress (σ_{yy})	-15	Ksi							
37		σ_{zz}	Stress (σ_{zz})	0	Ksi							
38		τ _{vz}	Stress (τ _{yz})	0	Ksi							
39		τ _{xz}	Stress (τ _{xz})	0	Ksi	***************************************						
40		τ_{xy}	Stress (τ _{xy})	15	Ksi							
41												
42												
	Χ	Option 2:	Measured Strain State From	n Rosettes	1							
44 45		Strain Gage	Rosette									
46		Variable	Description	Value	Units						-	
47		θ_{A}	Orientation Angle (A)		degree		000000000000000000000000000000000000000					
48		θ_{B}	Orientation Angle (B)		degree	1						
49		θ_{C}	Orientation Angle (C)		degree						***************************************	
50		θ	Gage Rotation Angle		degree							
51												
52		Measured S		Val	11							
53 54		Variable	Description	Value	Units						-	
55		ε _A	Strain (A) Strain (B)		μ in/in μ in/in						-	
56		ε _B	Strain (B)		μ in/in							
57		٥.	Januari (C)		r,							
<u> </u>		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~									-	
58	1											

MATLAB Project (#2) - Metallic Failure Stress Analysis SE-160A Aerospace Structural Analysis, University of California, San Diego (Copy Version: Winter, 2020 (v2) - Input: US, Output: US/SI Student Name: John Kosmatka Student ID: A0123456789 Project Title: Reader Example, Volume 1, page 240 (4.50), 2-D Stress Failure Analysis INPUT ECHO:	right J.B. Kosmatkı	a, 2020)				
3 SE-160A Aerospace Structural Analysis, University of California, San Diego (Copy 5 Version: Winter, 2020 (v2) - Input: US, Output: US/SI 6 Student Name: John Kosmatka 8 Student ID: A0123456789 9 Project Title: Reader Example, Volume 1, page 240 (4.50), 2-D Stress Failure Analysis	right J.B. Kosmatk	a, 2020)				
Version: Winter, 2020 (v2) - Input: US, Output: US/SI Student Name: John Kosmatka Student ID: A0123456789 Project Title: Reader Example, Volume 1, page 240 (4.50), 2-D Stress Failure Analysis INPUT ECHO:	right J.B. Kosmatki	a, 2020)				-
5 Student Name: John Kosmatka Student ID: A0123456789 Project Title: Reader Example, Volume 1, page 240 (4.50), 2-D Stress Failure Analysts INPUT ECHO:						
7 Student Name: John Kosmatka 8 Student ID: A0123456789 9 10 Project Title: Reader Example, Volume 1, page 240 (4.50), 2-D Stress Failure Analyst 11 12 INPUT ECHO:						
8 Student ID: A0123456789 9 Project Title: Reader Example, Volume 1, page 240 (4.50), 2-D Stress Failure Analyst 11 12 INPUT ECHO:						
9 Project Title: Reader Example, Volume 1, page 240 (4.50), 2-D Stress Failure Analyst 11 INPUT ECHO:						
10 Project Title: Reader Example, Volume 1, page 240 (4.50), 2-D Stress Failure Analyst 11 INPUT ECHO:						+
12 INPUT ECHO:	sis, 7075-T6 Al					1
						_
13 14 Variable Description Value Units		Units Re	foronco			+
14 Variable Description Value Units 1 1 = US, 2 = SI		US	SI			+
16 <i>iOutput</i> Output Units 1 1 = US, 2 = SI	σ, τ	10 ³ lb/in ²	MPa			+-
17	E, G	10 ⁶ lb/in ²	GPa			
18						
19 Material Properties						
20 Variable Description A-Basis B-Basis Uni						\coprod
21 E Young's Modulus 10.3000 10.3000 22 G Shear Modulus 3.9000 3.9000	Msi Msi					+
$\sigma_{\gamma 7}$ yield strength - tension 68.0000 70.0000	Ksi					
24 σ_{uT} ultimate strength - tension 78.0000 80.0000	Ksi					
25 σ_{yc} yield strength - compression -70.0000 -73.0000	Ksi					T
26 σ_{uc} ultimate strength - compres -78.0000 -80.0000	Ksi					
27 τ_y yield strength - shear 35.2500 35.2500	Ksi					
28 τ_u ultimate strength - shear 46.0000 48.0000	Ksi					
30 Safety Factors						+
31 Variable Description Value Units						+-
32 SF _v Safety Factor - yield 1.1 1						
33 SF u Safety Factor - ultimate 1.5 1						
34						
35 Applied Stress State						
36 Variable Description Value Units 37 σ _{vx} Normal Stress - x 25.0000 Ksi						
σ_{xx} Normal Stress - x 25.0000 Ksi σ_{yy} Normal Stress - y -15.0000 Ksi						+
39 σ _{zz} Normal Stress - z 0.0000 Ksi						+-
40 τ _{νz} Shear Stress - yz 0.0000 Ksi						
41 τ _{xz} Shear Stress - xz 0.0000 Ksi						
42 τ _{xy} Shear Stress - xy 15.0000 Ksi						
43						
44 45 OUTPUT:						-
46						
47 1.) Principal Stress State	'			,		
48 Provinting 1						4
49 Variable Description 1 2 3 50 σ _p Principal Stresses -20.0000 0.0000 30	Units 0.0000 Ksi					+
	0.9487 1					+
52 {Φ} Eigenvector {Q} -0.9487 0.0000 -0	0.3162 1					
53 0.0000 1.0000 0	<mark>0.0000</mark> 1					
54						\coprod
55 Variable Description Value Units 56 τ _{max} Maximum Shear Stress 25.0000 Ksi						+-
56 τ _{max} Maximum Shear Stress 25.0000 Ksi					 	+
E0 .	l					
59 2.5 ×10 ⁴						
60						П
61 2					-	+
62 63 1.5						+
64						Ħ
65 1						
66 0.5	\					\perp
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	1					+
68 (SS) 0 (DS) 170 (D	-					
70						
71 -0.3	//	1	·	1		

Δ	АВ	С	D	Е	F	G	Н	1	1	K	L M	N
72	<u>, , , , , , , , , , , , , , , , , , , </u>			· \		<i>]</i>	' ''		,	, ,		<u> </u>
73	 	-1					1					-
74		-1.5				_/						1
75		-1.5				/						
76		-2										
77	·	_										
78		-2.5										
79			-2 -1	0 1	_	3						
80				sigma (Ksi))	×	:10 ⁴					
81								•				
82	2.)	Allowable S	trengths				ı		ì	1	_	
83												
84		Variable	Description	A-Basis	B-Basis	Units						
85		σ_{T}^*	Allowable Tension	52.0000	53.3333	Ksi						
86		σ_{c}^{*}	Allowable Compression	-52.0000	-53.3333	Ksi						
87		τ*	Allowable Shear	30.6667	32.0000	Ksi						
88		τ*	Allow Shear Tresca (Mixed)	26.0000	26.6667	Ksi						-
89			((a.a.)								L	
90	3.)	Margin of S	atety (MS)							l	_	
92		0.011 0	Annair of Cofets	Danista -	T*	\/ N A :						-
93			Nargin of Safety	Rankine	Tresca*	Von Mises					-	
		MS _{min} (A)	Min Margin of Safety (A Basi	0.7333	0.0400	0.1930						-
94		MS _{min} (B)	Min Margin of Safety (B Basi	0.7778	0.0667	0.2236						-
95 96		A !!! C+	C++- f (AACO) A Di-									-
96		Variable	ess State for (MS=0) - A Basis Description	Rankine	Tresca*	Von Mises	Units				-	
98				43.3333	26.0000						-	
98		σ _{xx}	Normal Stress - x	-26.0000	-15.6000	29.8240 -17.8944	Ksi				-	
100		σ _{γγ}	Normal Stress - y	0.0000	0.0000	0.0000	Ksi Ksi				-	-
		σ_{zz}	Normal Stress - z								-	
101		τ_{yz}	Shear Stress - yz	0.0000	0.0000	0.0000	Ksi					-
102		τ _{xz}	Shear Stress - xz	0.0000	0.0000	0.0000	Ksi					-
103		τ_{xy}	Shear Stress - xy	26.0000	15.6000	17.8944	Ksi				-	-
104 105		Annlied C+	ess State for (MS=0) - B Basis								+	
105		Variable	Description	Rankine	Tresca*	Von Mises	Units				 	
106			Normal Stress - x	44.4444	26.6667	30.5888	Ksi				+	
107		σ_{xx}		-26.6667		-18.3533	Ksi				++	
108		σ _{γγ}	Normal Stress - y Normal Stress - z	0.0000	-16.0000 0.0000	0.0000	Ksi				-	
110		σ_{zz}	Shear Stress - yz	0.0000	0.0000	0.0000	Ksi				++	۱
111		τ _{yz}	Shear Stress - yz Shear Stress - xz	0.0000	0.0000	0.0000	Ksi				++	۱
111		τ _{xz}		26.6667	16.0000	18.3533	Ksi				++	
		τ_{xy}	Shear Stress - xy	20.0067	16.0000	18.3333	KSI				 	
113 114		* Note: Fo	r the Tresca Criteria: the Man	gin of Safety calcu	lations donord	unon the stre	cc ctato:				-	
115		NOTE. TO	the Tresca Criteria; the Margin of Safety calculations depend upon the stress state: for pure <u>tension</u> , MS is the minimum of the tension (σ_{τ}^*) criteria, shear (τ^*) criteria, and shear ($\sigma_{\tau}^*/2$) criteria									
116			for pure compression, MS is the minimum of the compression (σ_c^*) criteria, shear (τ^*) criteria, and shear (σ_c^*) cr									
117												
117			for <u>mixed stress</u> , MS is the minimum of tension (σ_T^*), compression (σ_C^*), shear (τ^*), and shear ($(\sigma_T^* - \sigma_C^*)/4$) criteria									
119	End of	Output										
120		Justput										f
121												Н
122												H
	-											ш