

1a) Assuming that the system administrator takes 10 min to reboot the machine, what is the application server availability? (15 points)

The application server is rebooted 20 times a day and it takes 10 minutes to reboot the machine. $20 \times 10 = 200$. The application server has an average downtime of 200 minutes per day. Since a day has 1440 minutes and we have 200 minutes of downtime, we then have 1240 minutes of uptime. Availability = uptime / (uptime + downtime). $1240 / 1440 = 0.861$. The application server's availability is 0.861.

1b) Assuming also that the database server goes down for one minute every four hours, what is its availability? What is the availability of the whole site? (15 points)

Since the database goes down for one minute every four hours, it has a downtime of 1 minute for every 239 minutes of uptime. Its availability = $239 / (239 + 1) = 0.99583$. In a day, the database goes down 6 times for a total of 6 minutes. It has a downtime of 6 minutes in a 1440 minute period. We can add the downtime of the application server with the downtime of the database server. This gives us a downtime of 206 and an uptime of 1234. Since the site needs both servers to be online to be functional, we can use these values to calculate availability. Availability = $1234 / (1234 + 206) = 0.85694$. The website's availability is 0.85694.

2b) Exit entry independent paths

ABK

A(BCEFGJ)*BK

A(BCEFHJ)*BK

A(BCEFIJ)*BK

A(BCDFGJ)*BK

A(BCDFHJ)*BK

A(BCDFIJ)*BK

2c) Test Cases

ABK

Input		Expected Output				
<table><tr><td>size</td><td>data[]</td></tr><tr><td>0</td><td>{ }</td></tr></table>		size	data[]	0	{ }	No output
size	data[]					
0	{ }					

A(BCEFGJ)*BK

This path has errors because E sets msg=1 while G executes if msg=0

Input		Expected Output
size	data[]	
1	{1}	
2	{1,3}	

A(BCEFHJ)*BK

Input		Expected Output
		“data [“1”] is odd\n” “data [“1”] is odd\n” “data [“3”] is odd\n”
size	data[]	
1	{1}	
2	{1,3}	

A(BCEFIJ)*BK

This path has errors because if msg=1 then the default case should not be executed

Input		Expected Output
		“Opps! \n”
size	data[]	
1	{1}	

A(BCDFGJ)*BK

Input		Expected Output
size	data[]	"data ["2"] is even\n" "data ["12"] is even\n" "data ["4"] is even\n"
1	{2}	
2	{12,4}	

A(BCDFHJ)*BK

This path has errors because D sets msg=0 while H executes when msg=1

Input		Expected Output
size	data[]	"data ["6"] is odd\n" "data ["4"] is odd\n" "data ["8"] is odd\n"
1	{6}	
2	{4,8}	

A(BCDFIJ)*BK

This path has errors because D sets msg=0. If msg=0, the default case should not be executed

Input		Expected Output
size	data[]	"Opps! \n"
1	{1}	