

FROM BUGS TO FIXES : A BEGINNERS GUIDE TO PROGRAM CRASHES

Vedant V. Amrutkar

Vedantamrutkar31@gmail.com

Bohra central school , parola

ABSTRACT:

Programs crash due to various reasons, including common mistakes that programmers incorporate while building software, especially for those who have little knowledge and experience. This paper will, therefore, highlight various reasons why programs tend to crash, especially due to minor mistakes that programmers, especially young ones, tend to miss. This essay will concentrate on aspects regarding various mistakes that programmers can easily miss while building programs, including syntax, logic, and memory. In addition, website applications will also be fully addressed. Most especially, aspects regarding programs written using C++ programming, such as pointer, overflowing, and leaks, will be addressed. Lack of proper handling regarding exceptions will also be addressed, especially due to environmental factors. Simple debugging will also be addressed, including various practices when one is building programs.

KEYWORDS:

Program crashes, Syntax errors, Logic errors, Memory management, C++ programming, Debugging technique.

INTRODUCTION :

Programs are made to accomplish tasks, but sometimes they just suddenly stop working. This sudden unexpected stopping of a program is referred to as a program crash. Program crashes can occur because of errors in programming, a shortage of system resources, or errors in the processing of data. Program crashes can be puzzling for new programmers. Program crashes occur frequently in games, applications, and even operating systems. Understanding the fundamental causes of program crashes is the first step towards becoming a proficient programmer.

1. Programming Errors (Bugs)

Programming errors like incorrect logic, syntax errors, or unconsidered conditions in the source code can result in unexpected program crashes.

2. Memory Management Errors

Using more memory than is available or accessing memory outside the allocated region can result in errors like memory leaks or segmentation faults.

3. Lack of System Resources

Program crashes can occur when the system lacks sufficient RAM, CPU, or storage space to continue program execution.

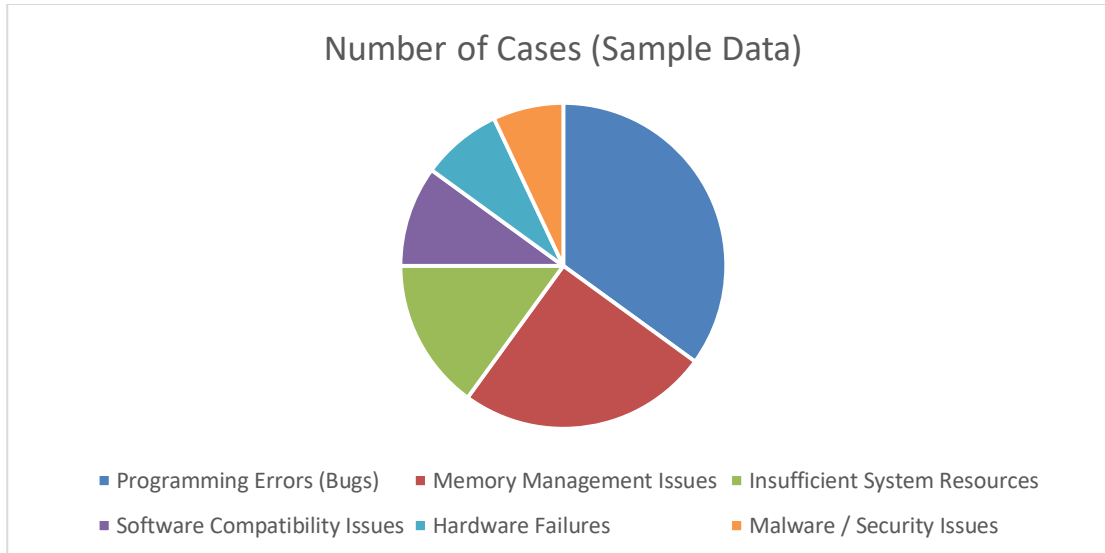
4. Software Compatibility Errors

Using a program on an unsupported operating system or outdated libraries can result in compatibility errors and program crashes.

OBJECTIVES:

- 1. To define what a program crash is** and explain how it affects software performance and user experience.
- 2. To identify the most common causes of program crashes**, including programming errors, memory issues, and system limitations.
- 3. To explain basic programming mistakes** that often lead to crashes, in a way that beginners can easily understand.
- 4. To examine the role of user input and system environment** in causing software crashes.

5. To explore simple methods developers use to prevent crashes, such as testing and error handling.
6. To help beginners understand the importance of debugging and proper coding practices in creating stable programs.

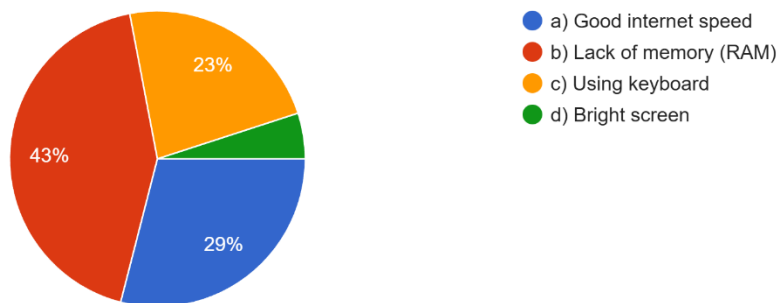


DATA COLLECTION :

Q1. Which of the following is a common reason for program crashes?

Q2. Which of the following is a common reason for program crashes?

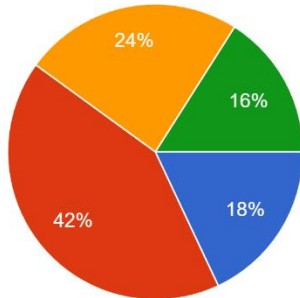
100 responses



Q2. What happens when a program has an error (bug)?

Q3. What happens when a program has an error (bug)?

100 responses

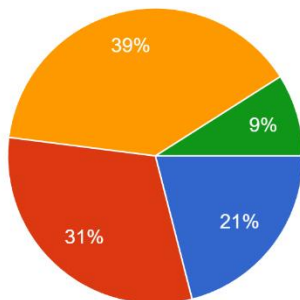


- a) It always runs smoothly
- b) It may crash or give wrong output
- c) It deletes files
- d) It upgrades automatically

Q3. What is a syntax error?

Q5. What is a syntax error?

100 responses

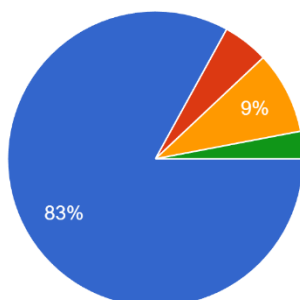


- a) Error in computer hardware
- b) Error caused by virus
- c) Error due to wrong programming rules
- d) Error in internet connection

Q4. Can insufficient system resources cause program crashes

Q6. Can insufficient system resources cause program crashes?

100 responses

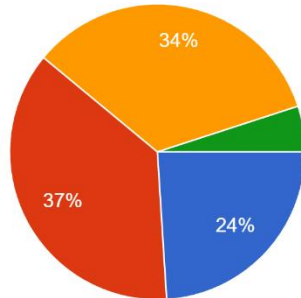


- a) Yes
- b) No
- c) Sometimes only online
- d) Only in mobile phones

Q5. Which of the following can help prevent program crashes?

Q7. Which of the following can help prevent program crashes?

100 responses



- a) Ignoring errors
- b) Proper testing and debugging
- c) Closing antivirus
- d) Reducing screen brightness

HYPOTHESIS :

H1) Which of the following is a common reason for program crashes?

SR NO.	HYPOTHESIS OPTION	O _i	E _i	O _i -E _i	(O _i -E _i) ²	(O _i -E _i) ² /E _i
1.	Good internet speed	29	25	4	16	0.64
2.	Lack of memory (RAM)	43	25	18	324	12.96
3.	Using keyboard	23	25	-2	4	0.16
4.	Bright screen	5	25	-20	400	16
	TOTAL	100				29.76

$$\sum (O_i - E_i)^2 / E_i = 29.76$$

Degree Of Freedom (D.F.) Is 3

Therefore, Tabulated Value Of

X² as 3

$$X^2 = 29.76 > 7.815^*$$

The result will be positive by chi-square test.

H2) Which of the following is a common reason for program crashes?

SR NO.	HYPOTHESIS OPTION	O _i	E _i	O _i -E _i	(O _i -E _i) ²	(O _i -E _i) ² /E _i
1.	Yes	83	25	58	3364	134.56
2.	NO	5	25	-20	400	16
3.	Sometimes only online	9	25	-16	256	10.24
4.	Only in mobile phones	3	25	-22	484	19.36
	TOTAL	100				180.16

$$\sum (O_i - E_i)^2 / E_i = 180.16$$

Degree Of Freedom (D.F.) Is 3

Therefore, Tabulated Value Of

X² as 3

$$X^2 = 180.16 > 7.815^*$$

The result will be positive by chi-square test.

CONCLUSION :

Programs crash mainly due to software bugs and errors in coding, which cause the program to behave unexpectedly. Lack of sufficient memory or system resources can force programs to stop working suddenly. Hardware problems such as faulty RAM, hard disk issues, or overheating also contribute to program crashes. Incompatible software updates or outdated drivers can create conflicts that lead to crashes. Poor testing and debugging before releasing a program increase the chances of frequent crashes. User actions, such as installing untrusted software or forcing programs to close, can also cause crashes.

REFERENCES :

1. Cyberly — Common causes of software crashes (memory leaks, null references, resource problems, etc.) explains in-depth why software crashes.
2. Techopedia — What is a software bug? Describes how software bugs cause software malfunctions and crashes.
3. Wikipedia — Memory corruption article demonstrates how improper memory usage can cause software crashes when a program tries to access memory that is not valid.
4. Wikipedia — Stack buffer overflow and Buffer overflow articles explain how going beyond memory limits can cause software crashes.
5. GeeksforGeeks — Crash failure in system design explains the common causes of system crashes such as memory problems, software bugs, resource problems, and hardware failures.
6. Times of India — 10 causes of frequent computer crashes explains practical causes such as low memory, hardware problems, software incompatibility, and outdated drivers.