A Survey of Fix Generation Usefulness

Thank you for participating in our survey. The purpose of this survey is to evaluate patches that are automatically generated by our tool, which is based on Neural Machine Translation (NMT).

Our tool learns past fixes from project history and generates fixing patches for real bug-inducing commits. Through this survey, we would like to know whether the generated patches are useful or not.

The survey consists of 15 evaluations and should take 10-20 minutes to complete.

Your participation in this survey is voluntary. You have the right to not participate or to stop participating at any time without penalty.

Once again, thank you for your assistance!

* Required

1. **How would you best describe yourself?** *
   Mark only one oval.

   ( ) Undergraduate student

   ( ) Graduate student

   ( ) Developer

   ( ) Other: _____

2. **How many years of development experience do you have?** *
   Mark only one oval.

   ( ) Less than 1 year

   ( ) 1-3 years

   ( ) 3-5 years

   ( ) More than 5 years

3. **How do you estimate your programming experience?** *
   Mark only one oval.

	1	2	3	4	5	
Very inexperienced	( )	( )	( )	( )	( )	Very experienced

4. **How experienced are you with Java?** *
   Mark only one oval.

	1	2	3	4	5	
Very inexperience	( )	( )	( )	( )	( )	Very experienced

1/15

Original problematic code

```
config=cluster.getDesiredConfigByType("global");
Assert.assertNotNull(config);
Assert.assertNotSame(version,config.getVersionTag());
Assert.assertTrue(config.getProperties().containsKey("x"));
Assert.assertEquals("z",config.getProperties().get("x"));
```

Actual fix

```
config=cluster.getDesiredConfigByType("global");
Assert.assertNotNull(config);
Assert.assertSame(version,config.getVersionTag());
Assert.assertTrue(config.getProperties().containsKey("x"));
Assert.assertEquals("z",config.getProperties().get("x"));
```

Proposed fix

```
config=cluster.getDesiredConfigByType("global");
Assert.assertNotNull(config);
Assert.assertFalse(version,config.getVersionTag());
Assert.assertTrue(config.getProperties().containsKey("x"));
Assert.assertEquals("z",config.getProperties().get("x"));
```

5. **The proposed fix helps you to understand the required change** *
   Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

6. **The proposed fix can be a reference if you were to create your own fix** *
   Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

7. **The proposed fix is harmful or confusing** *
   Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

8. **The proposed fix does not make sense and I will just ignore it** *
   Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

9. **Any comments**

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2/15

Original problematic code

```
AmbariMetaInfo mockAmbariMetaInfo=mockSupport.createMock(AmbariMetaInfo.class);
expect(mockStackComponentResponse.getComponentName()).andReturn("FALCON_SERVER");
expect(mockStackComponentResponse.getCardinality()).andReturn("1");
expect(mockStackComponentResponse.getAutoDeploy()).andReturn(new
AutoDeployInfo());
```

Actual fix

```
AmbariMetaInfo mockAmbariMetaInfo=mockSupport.createMock(AmbariMetaInfo.class);
expect(mockStackComponentResponse.getComponentName()).andReturn("FALCON_SERVER").atLeastOnce();
expect(mockStackComponentResponse.getCardinality()).andReturn("1");
expect(mockStackComponentResponse.getAutoDeploy()).andReturn(new AutoDeployInfo());
```

Proposed fix

```
AmbariMetaInfo mockAmbariMetaInfo=mockSupport.createMock(AmbariMetaInfo.class);
expect(mockStackComponentResponse.getComponentName()).andReturn("FALCON_SERVER").atLeastOnce();
expect(mockStackComponentResponse.getCardinality()).andReturn("1");
expect(mockStackComponentResponse.getAutoDeploy()).andReturn(new AutoDeployInfo());
```

10. **The proposed fix helps you to understand the required change** *
    Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

11. **The proposed fix can be a reference if you were to create your own fix** *
Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

12. **The proposed fix is harmful or confusing** *
Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

13. **The proposed fix does not make sense and I will just ignore it** *
Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

14. **Any comments**

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3/15

Original problematic code

```
{
  return m_scope;
}
```

Actual fix

```
{
  return scope;
}
```

Proposed fix

```
{
  return defaultString();
}
```

15. **The proposed fix helps you to understand the required change** *

Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

16. **The proposed fix can be a reference if you were to create your own fix** *

Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

17. **The proposed fix is harmful or confusing** *

Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

18. **The proposed fix does not make sense and I will just ignore it** *

Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

19. **Any comments**

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4/15

Original problematic code

```
MockEndpoint end=getMockEndpoint("mock:end");
end.expectedMessageCount(1);
MockEndpoint complete=getMockEndpoint("mock:complete");
complete.expectedBodiesReceived("finish","stop","faulted","except");
template.sendBody("direct:input","finish");
template.sendBody("direct:input","stop");
template.sendBody("direct:input","fault");
```

Actual fix

```
MockEndpoint end=getMockEndpoint("mock:end");
end.expectedMessageCount(1);
MockEndpoint complete=getMockEndpoint("mock:complete");
complete.expectedBodiesReceivedInAnyOrder("finish","stop","faulted","except");
template.sendBody("direct:input","finish");
template.sendBody("direct:input","stop");
template.sendBody("direct:input","fault");
```

Proposed fix

```
MockEndpoint end=getMockEndpoint("mock:end");
end.expectedMessageCount(1);
MockEndpoint complete=getMockEndpoint("mock:complete");
complete.expectedBodiesReceivedInAnyOrder("finish","stop","faulted","except");
template.sendBody("direct:input","finish");
template.sendBody("direct:input","stop");
template.sendBody("direct:input","fault");
```

20. **The proposed fix helps you to understand the required change** *
    Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

21. **The proposed fix can be a reference if you were to create your own fix** *
    Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

22. **The proposed fix is harmful or confusing** *
    Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

23. The proposed fix does not make sense and I will just ignore it *

Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

24. Any comments

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5/15

Original problematic code

```
LOG.trace("Removing timeout channel as we received
message");
ctx.getPipeline().remove(handler);
```

Actual fix

```
LOG.trace("Removing timeout channel as we received
message");
ctx.pipeline().remove(handler);
```

Proposed fix

```
LOG.trace("Removing timeout channel as we received
message");
ctx.setTracing();
```

25. The proposed fix helps you to understand the required change *

Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

26. **The proposed fix can be a reference if you were to create your own fix** *
Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

27. **The proposed fix is harmful or confusing** *
Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

28. **The proposed fix does not make sense and I will just ignore it** *
Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

29. **Any comments**

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6/15

Original problematic code

```
getMockEndpoint(MOCK_RESULT_URI).expectedMessageCount(1);
Map<Object,Object> map=new HashMap<>();
map.put("Hello","Camel");
map.put("Int",Integer.MAX_VALUE);
map.put("Boolean",Boolean.TRUE);
```

Actual fix

```
getMockEndpoint(MOCK_RESULT_URI).expectedMessageCount(1);
Map<Object,Object> map=new HashMap<Object,Object>();
map.put("Hello","Camel");
map.put("Int",Integer.MAX_VALUE);
map.put("Boolean",Boolean.TRUE);
```

Proposed fix

```
getMockEndpoint(MOCK_RESULT_URI).expectedMessageCount(1);
Map<String,Object> map=new HashMap<String,Object>();
map.put("Hello","Camel");
map.put("Int",Integer.MAX_VALUE);
map.put("Boolean",Boolean.TRUE);
```

30. **The proposed fix helps you to understand the required change** *
    Mark only one oval.

	1	2	3	4	5	
Strongly disagree	⬭	⬭	⬭	⬭	⬭	Strongly agree

31. **The proposed fix can be a reference if you were to create your own fix** *
    Mark only one oval.

	1	2	3	4	5	
Strongly disagree	⬭	⬭	⬭	⬭	⬭	Strongly agree

32. **The proposed fix is harmful or confusing** *
    Mark only one oval.

	1	2	3	4	5	
Strongly disagree	⬭	⬭	⬭	⬭	⬭	Strongly agree

33. **The proposed fix does not make sense and I will just ignore it** *
    Mark only one oval.

	1	2	3	4	5	
Strongly disagree	⬭	⬭	⬭	⬭	⬭	Strongly agree

34. **Any comments**

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7/15

Original problematic code

```
random.nextBytes(toAppend);
out=(HdfsDataOutputStream)fs.append(file);
out.write(toAppend);
out.hflush();
```

Actual fix

```
random.nextBytes(toAppend);
out=(HdfsDataOutputStream)fs.append(file);
out.write(toAppend);
out.hsync(EnumSet.of(HdfsDataOutputStream.SyncFlag.UPDATE_LENGTH));
```

Proposed fix

```
random.nextBytes(toAppend);
out=(HdfsDataOutputStream)fs.append(file);
out.write(toAppend);
out.flushOrSync();
```

35. **The proposed fix helps you to understand the required change** *

Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

36. **The proposed fix can be a reference if you were to create your own fix** *

Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

37. **The proposed fix is harmful or confusing** *

Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

38. **The proposed fix does not make sense and I will just ignore it** *

Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

39. **Any comments**

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Original problematic code

```
FSDataOutputStream fos=null;
String dirFileIdPath=Nfs3Utils.getFileIdPath(dirHandle);
WccAttr preOpDirAttr=null;
Nfs3FileAttributes postOpObjAttr=null;
```

Actual fix

```
HdfsDataOutputStream fos=null;
String dirFileIdPath=Nfs3Utils.getFileIdPath(dirHandle);
WccAttr preOpDirAttr=null;
Nfs3FileAttributes postOpObjAttr=null;
```

Proposed fix

```
HdfsDataOutputStream copyError=null;
String dirFileIdPath=Nfs3Utils.getFileIdPath(dirHandle);
WccAttr preOpDirAttr=null;
Nfs3FileAttributes postOpObjAttr=null;
```

40. **The proposed fix helps you to understand the required change** *
    Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

41. **The proposed fix can be a reference if you were to create your own fix** *
    Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

42. **The proposed fix is harmful or confusing** *
    Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

43. **The proposed fix does not make sense and I will just ignore it** *
    Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

44. **Any comments**

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9/15

Original problematic code

```
try {
  proto.removePathBasedCacheDirective(43l);
  Assert.fail("expected an error when removing a non-
existent ID");
}
```

Actual fix

```
try {
  proto.removePathBasedCacheDirective(43l);
  fail("expected an error when removing a non-existent
ID");
}
```

Proposed fix

```
try {
  proto.removePathBasedCacheDirective(43l);
  fail("expected an error when removing a non-existent
ID");
}
```

45. **The proposed fix helps you to understand the required change** *
    Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

46. **The proposed fix can be a reference if you were to create your own fix** *
    Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

47. **The proposed fix is harmful or confusing** *
    Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

48. **The proposed fix does not make sense and I will just ignore it** *
    Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

49. **Any comments**

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Original problematic code

```
this.state=ConnectionState.CLOSED;
this.closeInfo=close;
this.inputAvailable=false;
this.outputAvailable=false;
```

Actual fix

```
this.state=ConnectionState.CLOSED;
finalClose.compareAndSet(null,close);
this.inputAvailable=false;
this.outputAvailable=false;
```

Proposed fix

```
this.state=ConnectionState.CLOSED;
this=close;
this.inputAvailable=false;
this.outputAvailable=false;
```

50. **The proposed fix helps you to understand the required change** *
    Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

51. **The proposed fix can be a reference if you were to create your own fix** *
    Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

52. **The proposed fix is harmful or confusing** *
    Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

53. **The proposed fix does not make sense and I will just ignore it** *
    Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

54. **Any comments**

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Original problematic code

```
{
  return !parser.parse(buffer);
}
```

Actual fix

```
{
  return parser.parse(buffer);
}
```

Proposed fix

```
{
  return parser.parse(buffer);
}
```

55. **The proposed fix helps you to understand the required change** *
    Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

56. **The proposed fix can be a reference if you were to create your own fix** *
    Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

57. **The proposed fix is harmful or confusing** *
    Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

58. **The proposed fix does not make sense and I will just ignore it** *
    Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

12/15

Original problematic code

```
if (dirMatcher.matches(dir)) {
    StartLog.debug("Following dir: " + dir);
    if (includeDirsInResults && fileMatcher.matches(dir))
{
        addHit(dir);
    }
    return FileVisitResult.CONTINUE;
}
else {
    StartLog.debug("Skipping dir: " + dir);
    return FileVisitResult.SKIP_SUBTREE;
}
```

Actual fix

```
if (dirMatcher.matches(dir)) {
    StartLog.trace("Following dir: " + dir);
    if (includeDirsInResults && fileMatcher.matches(dir))
{
        addHit(dir);
    }
    return FileVisitResult.CONTINUE;
}
else {
    StartLog.trace("Skipping dir: " + dir);
    return FileVisitResult.SKIP_SUBTREE;
}
```

Proposed fix

```
if (dirMatcher.matches(dir)) {
    StartLog.info("Following dir: " + dir);
    if (includeDirsInResults && fileMatcher.matches(dir))
{
        addHit(dir);
    }
    return FileVisitResult.CONTINUE;
}
else {
    StartLog.info("Skipping dir: " + dir);
    return FileVisitResult.SKIP_SUBTREE;
}
```

60. **The proposed fix helps you to understand the required change** *
    Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

61. **The proposed fix can be a reference if you were to create your own fix** *
    Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

62. **The proposed fix is harmful or confusing** *
    Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

63. **The proposed fix does not make sense and I will just ignore it** *
    Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

64. **Any comments**

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Original problematic code

```
if (number == null) {
  return null;
}
return new BigInteger(number.toString());
```

Actual fix

```
if (number == null) {
  return null;
}
return number.toBigInteger();
```

Proposed fix

```
if (number == null) {
  return null;
}
return new toHexString(number.toString());
```

65. **The proposed fix helps you to understand the required change** *
Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

66. **The proposed fix can be a reference if you were to create your own fix** *
Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

67. **The proposed fix is harmful or confusing** *
Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

68. **The proposed fix does not make sense and I will just ignore it** *

Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

69. **Any comments**

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14/15

Original problematic code

```
if (this.sizes == null) {
    this.sizes=new ArrayList<String>();
}
this.sizes.clear();
this.sizes.addAll(Arrays.asList(sizes));
```

Actual fix

```
if (this.sizes == null) {
    this.sizes=new ArrayList<>();
}
this.sizes.clear();
this.sizes.addAll(Arrays.asList(sizes));
```

Proposed fix

```
if (this.sizes == null) {
    sizes=new ArrayList<>();
}
this.sizes.clear();
this.sizes.addAll(Arrays.asList(sizes));
```

70. **The proposed fix helps you to understand the required change** *

Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

71. **The proposed fix can be a reference if you were to create your own fix** *
Mark only one oval.

	1	2	3	4	5	
Strongly disagree	⬭	⬭	⬭	⬭	⬭	Strongly agree

72. **The proposed fix is harmful or confusing** *
Mark only one oval.

	1	2	3	4	5	
Strongly disagree	⬭	⬭	⬭	⬭	⬭	Strongly agree

73. **The proposed fix does not make sense and I will just ignore it** *
Mark only one oval.

	1	2	3	4	5	
Strongly disagree	⬭	⬭	⬭	⬭	⬭	Strongly agree

74. **Any comments**

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15/15

Original problematic code

```
PackageResource resource=resourceReference.getResource();
IResourceStream
resourceStream=resource.getResourceStream();
String contentType=resourceStream.getContentType();
```

Actual fix

```
PackageResource resource=resourceReference.getResource();
IResourceStream
resourceStream=resource.getCacheableResourceStream();
String contentType=resourceStream.getContentType();
```

Proposed fix

```
PackageResource resource=resourceReference.getResource();
IResourceStream
resourceStream=resource.getCacheableResourceStream();
String contentType=resourceStream.getContentType();
```

75. **The proposed fix helps you to understand the required change** *
    Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

76. **The proposed fix can be a reference if you were to create your own fix** *
    Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

77. **The proposed fix is harmful or confusing** *
    Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

78. **The proposed fix does not make sense and I will just ignore it** *
    Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

79. **Any comments**

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