Parameter setting：

Learning rate = 0.5； Iteration = 1000， 1 iteration = 1 batch-size = number of test case

**Number of test case = 100**

**Buggy program has one bug:**

* **Bug version 1:**

Buggy statement = 5

Rank 1: (statement 5, suspiciousness = 0.2568012486682286)

Rank 2: (statement 1, suspiciousness = 0.13222307998706037)

Rank 3: (statement 9, suspiciousness = 0.09258570086591844)

Rank 4: (statement 7, suspiciousness = 0.06727268873938475)

Rank 5: (statement 10, suspiciousness = 0.05740812191540149)

Rank 6: (statement 11, suspiciousness = 0.05523086263333388)

Rank 7: (statement 8, suspiciousness = 0.04808058297713995)

Rank 8: (statement 4, suspiciousness = 0.047667379510243635)

Rank 9: (statement 6, suspiciousness = 0.039117714044654604)

Rank 10: (statement 2, suspiciousness = 0.027325926814468215)

Rank 11: (statement 12, suspiciousness = 0.026621518275444223)

Rank 12: (statement 3, suspiciousness = 0.019962360523465554)

EXAM = 1/12

* **Bug version 2:**

Buggy statement = 7

Rank 1: (statement 7, suspiciousness = 0.17378637093122168)

Rank 2: (statement 6, suspiciousness = 0.0799346650477214)

Rank 3: (statement 1, suspiciousness = 0.07144778736194579)

Rank 4: (statement 5, suspiciousness = 0.05431281489060234)

Rank 5: (statement 10, suspiciousness = 0.05405650291648363)

Rank 6: (statement 9, suspiciousness = 0.05311572770986288)

Rank 7: (statement 8, suspiciousness = 0.04862319650760695)

Rank 8: (statement 4, suspiciousness = 0.04663820379961916)

Rank 9: (statement 3, suspiciousness = 0.04208972075703057)

Rank 10: (statement 11, suspiciousness = 0.03913345372188462)

Rank 11: (statement 2, suspiciousness = 0.02160230199053208)

Rank 12: (statement 12, suspiciousness = 0.017847803316458858)

EXAM = 1/12

* **Bug version 3:**

Buggy statement = 9

Rank 1: (statement 9, suspiciousness = 0.19989306950331726)

Rank 2: (statement 1, suspiciousness = 0.12544968247829605)

Rank 3: (statement 5, suspiciousness = 0.12242868886487947)

Rank 4: (statement 10, suspiciousness = 0.10826736093906464)

Rank 5: (statement 7, suspiciousness = 0.09918870725632326)

Rank 6: (statement 6, suspiciousness = 0.09745672523520561)

Rank 7: (statement 8, suspiciousness = 0.07506514119828882)

Rank 8: (statement 11, suspiciousness = 0.05313949564994319)

Rank 9: (statement 4, suspiciousness = 0.047121216661242436)

Rank 10: (statement 2, suspiciousness = 0.026845372553098035)

Rank 11: (statement 3, suspiciousness = 0.025191297154861632)

Rank 12: (statement 12, suspiciousness = 0.024327450629251686)

EXAM = 1/12

* **Bug version 4:**

Buggy statement = 11

Rank 1: (statement 11, suspiciousness = 0.15867005305708945)

Rank 2: (statement 1, suspiciousness = 0.12646216707438662)

Rank 3: (statement 9, suspiciousness = 0.07869137072979038)

Rank 4: (statement 7, suspiciousness = 0.07414221433518088)

Rank 5: (statement 8, suspiciousness = 0.07206750885590905)

Rank 6: (statement 6, suspiciousness = 0.06154386565117877)

Rank 7: (statement 5, suspiciousness = 0.05945240545082452)

Rank 8: (statement 10, suspiciousness = 0.039339478918111945)

Rank 9: (statement 4, suspiciousness = 0.03403090777686266)

Rank 10: (statement 3, suspiciousness = 0.025060226210769837)

Rank 11: (statement 12, suspiciousness = 0.022784820622444118)

Rank 12: (statement 2, suspiciousness = 0.01968895826043198)

EXAM = 1/12

**Buggy program has two bugs:**

* **Bug version 1:**

Buggy statement = 5, 7

Rank 1: (statement 7, suspiciousness = 0.43464885108405177)

Rank 2: (statement 1, suspiciousness = 0.32994899452546034)

Rank 3: (statement 5, suspiciousness = 0.2714149500920581)

Rank 4: (statement 4, suspiciousness = 0.14314071091696437)

Rank 5: (statement 9, suspiciousness = 0.09708461154838417)

Rank 6: (statement 11, suspiciousness = 0.09008568025120371)

Rank 7: (statement 10, suspiciousness = 0.07495469590618835)

Rank 8: (statement 8, suspiciousness = 0.05075332416057119)

Rank 9: (statement 6, suspiciousness = 0.028193494107270015)

Rank 10: (statement 2, suspiciousness = 0.019769206885777435)

Rank 11: (statement 3, suspiciousness = 0.01846045240362479)

Rank 12: (statement 12, suspiciousness = 0.018295776443901044)

EXAM = 3/12

* **Bug version 2:**

Buggy statement = 5, 9

Rank 1: (statement 1, suspiciousness = 0.2218749937838339)

Rank 2: (statement 9, suspiciousness = 0.10241330739664717)

Rank 3: (statement 5, suspiciousness = 0.0823258963600144)

Rank 4: (statement 11, suspiciousness = 0.06687982114357233)

Rank 5: (statement 8, suspiciousness = 0.06276150758502716)

Rank 6: (statement 4, suspiciousness = 0.060582562112923)

Rank 7: (statement 7, suspiciousness = 0.04194737418497715)

Rank 8: (statement 6, suspiciousness = 0.04104773002955059)

Rank 9: (statement 10, suspiciousness = 0.037239169841562836)

Rank 10: (statement 3, suspiciousness = 0.026652133507463618)

Rank 11: (statement 12, suspiciousness = 0.02439719735031379)

Rank 12: (statement 2, suspiciousness = 0.0177409350841442)

EXAM = 3/12

* **Bug version 3:**

Buggy statement = 5, 11

Rank 1: (statement 11, suspiciousness = 0.2482307110786071)

Rank 2: (statement 1, suspiciousness = 0.15682768670732478)

Rank 3: (statement 5, suspiciousness = 0.1503856779586229)

Rank 4: (statement 4, suspiciousness = 0.09386060791394123)

Rank 5: (statement 10, suspiciousness = 0.09381732131022076)

Rank 6: (statement 9, suspiciousness = 0.08165116534936351)

Rank 7: (statement 7, suspiciousness = 0.053969438018985245)

Rank 8: (statement 8, suspiciousness = 0.050530036682690606)

Rank 9: (statement 6, suspiciousness = 0.04509237506047843)

Rank 10: (statement 3, suspiciousness = 0.025865911300015903)

Rank 11: (statement 2, suspiciousness = 0.024030520108530122)

Rank 12: (statement 12, suspiciousness = 0.02302985484305985)

EXAM = 3/12

* **Bug version 4:**

Buggy statement = 7, 9

Rank 1: (statement 9, suspiciousness = 0.13291058345270718)

Rank 2: (statement 1, suspiciousness = 0.11635952329284083)

Rank 3: (statement 7, suspiciousness = 0.08674102911029492)

Rank 4: (statement 11, suspiciousness = 0.0689193409797402)

Rank 5: (statement 6, suspiciousness = 0.06680126505211234)

Rank 6: (statement 5, suspiciousness = 0.06614241224472134)

Rank 7: (statement 8, suspiciousness = 0.04614563700285856)

Rank 8: (statement 10, suspiciousness = 0.04335179412255763)

Rank 9: (statement 4, suspiciousness = 0.03895224104224596)

Rank 10: (statement 3, suspiciousness = 0.028131167499876868)

Rank 11: (statement 12, suspiciousness = 0.027331989062516087)

Rank 12: (statement 2, suspiciousness = 0.01969718927692965)

EXAM = 3/12

* **Bug version 5:**

Buggy statement = 7, 11

Rank 1: (statement 10, suspiciousness = 0.15508559308878944)

Rank 2: (statement 11, suspiciousness = 0.1380295545126048)

Rank 3: (statement 7, suspiciousness = 0.1265366332791417)

Rank 4: (statement 6, suspiciousness = 0.10417919404374898)

Rank 5: (statement 1, suspiciousness = 0.0812649275239401)

Rank 6: (statement 4, suspiciousness = 0.060916165156347464)

Rank 7: (statement 9, suspiciousness = 0.041919019741354695)

Rank 8: (statement 8, suspiciousness = 0.03308931715124097)

Rank 9: (statement 12, suspiciousness = 0.026259420118349246)

Rank 10: (statement 5, suspiciousness = 0.02612964453789768)

Rank 11: (statement 2, suspiciousness = 0.024840917942642104)

Rank 12: (statement 3, suspiciousness = 0.0186103196225704)

EXAM = 3/12

* **Bug version 6:**

Buggy statement = 9, 11

Rank 1: (statement 1, suspiciousness = 0.47413807776041905)

Rank 2: (statement 9, suspiciousness = 0.26489208650145635)

Rank 3: (statement 11, suspiciousness = 0.2612184285212615)

Rank 4: (statement 7, suspiciousness = 0.12407205057953075)

Rank 5: (statement 5, suspiciousness = 0.12065637530397941)

Rank 6: (statement 8, suspiciousness = 0.11176743684742424)

Rank 7: (statement 10, suspiciousness = 0.07301912528545226)

Rank 8: (statement 4, suspiciousness = 0.05429674058108834)

Rank 9: (statement 6, suspiciousness = 0.043265781078160974)

Rank 10: (statement 3, suspiciousness = 0.02858503785571617)

Rank 11: (statement 12, suspiciousness = 0.02790866228549378)

Rank 12: (statement 2, suspiciousness = 0.02753675301367919)

EXAM = 3/12

**Buggy program has three bugs:**

* **Bug version 1:**

Buggy statement = 5, 7, 9

（去除最好和最差情况）

Rank 1: (statement 11, suspiciousness = 0.08711181294176537)

Rank 2: (statement 9, suspiciousness = 0.08279321824948081)

Rank 3: (statement 5, suspiciousness = 0.07873329049859809)

Rank 4: (statement 4, suspiciousness = 0.06476595337516793)

Rank 5: (statement 7, suspiciousness = 0.05800588880085853)

Rank 6: (statement 6, suspiciousness = 0.056168323406758154)

Rank 7: (statement 10, suspiciousness = 0.05211419804711204)

Rank 8: (statement 1, suspiciousness = 0.049831407916577294)

Rank 9: (statement 2, suspiciousness = 0.04154178402186692)

Rank 10: (statement 8, suspiciousness = 0.03660665869826643)

Rank 11: (statement 12, suspiciousness = 0.019092355316084646)

Rank 12: (statement 3, suspiciousness = 0.016526415909142007)

EXAM = 5/12 （range between 3/12 ~ 10/12）

* **Bug version 2:**

Buggy statement = 5, 9, 11

Rank 1: (statement 5, suspiciousness = 0.13555107680202402)

Rank 2: (statement 9, suspiciousness = 0.09975918578804674)

Rank 3: (statement 7, suspiciousness = 0.09672360459235757)

Rank 4: (statement 11, suspiciousness = 0.08892435673458186)

Rank 5: (statement 10, suspiciousness = 0.0870913652807938)

Rank 6: (statement 1, suspiciousness = 0.07429587752775431)

Rank 7: (statement 6, suspiciousness = 0.06327939214716657)

Rank 8: (statement 8, suspiciousness = 0.03655001303782509)

Rank 9: (statement 3, suspiciousness = 0.03440745677437624)

Rank 10: (statement 4, suspiciousness = 0.024875843762999568)

Rank 11: (statement 12, suspiciousness = 0.022011815115141203)

Rank 12: (statement 2, suspiciousness = 0.021083850069431285)

EXAM = 4/12

* **Bug version 3:**

Buggy statement = 7, 9, 11

Rank 1: (statement 9, suspiciousness = 0.3646883498873885)

Rank 2: (statement 1, suspiciousness = 0.21721311237575305)

Rank 3: (statement 7, suspiciousness = 0.19605820267176588)

Rank 4: (statement 11, suspiciousness = 0.13776316332690627)

Rank 5: (statement 10, suspiciousness = 0.11706187283768253)

Rank 6: (statement 8, suspiciousness = 0.09568187387768327)

Rank 7: (statement 4, suspiciousness = 0.09171624135553746)

Rank 8: (statement 6, suspiciousness = 0.06789005242630275)

Rank 9: (statement 5, suspiciousness = 0.06401829629549545)

Rank 10: (statement 2, suspiciousness = 0.04575135816759309)

Rank 11: (statement 12, suspiciousness = 0.035637565752617395)

Rank 12: (statement 3, suspiciousness = 0.02189749354718975)

EXAM = 4/12

* **Bug version 4:**

Buggy statement = 5, 7, 11

Rank 1: (statement 7, suspiciousness = 0.09216006713407593)

Rank 2: (statement 10, suspiciousness = 0.06887465438820257)

Rank 3: (statement 9, suspiciousness = 0.06456424966601612)

Rank 4: (statement 1, suspiciousness = 0.06209983133375425)

Rank 5: (statement 11, suspiciousness = 0.061394693617149367)

Rank 6: (statement 5, suspiciousness = 0.051780137558216977)

Rank 7: (statement 6, suspiciousness = 0.0479584441027115)

Rank 8: (statement 3, suspiciousness = 0.0329581584554738)

Rank 9: (statement 2, suspiciousness = 0.03253461220005596)

Rank 10: (statement 8, suspiciousness = 0.02141743868658484)

Rank 11: (statement 4, suspiciousness = 0.020660605943824545)

Rank 12: (statement 12, suspiciousness = 0.01958836502738611)

EXAM = 5/12

EXAM(总体的) 约为4/12

**Buggy program has four bugs:**

* **Bug version 1:**

Buggy statement = 5, 7, 9, 11

Rank 1: (statement 7, suspiciousness = 0.25639750441212494)

Rank 2: (statement 5, suspiciousness = 0.1662876804024403)

Rank 3: (statement 9, suspiciousness = 0.09678178782647945)

Rank 4: (statement 1, suspiciousness = 0.09639775960351793)

Rank 5: (statement 11, suspiciousness = 0.0961890190322993)

Rank 6: (statement 10, suspiciousness = 0.05867445637206311)

Rank 7: (statement 4, suspiciousness = 0.04753905677906031)

Rank 8: (statement 8, suspiciousness = 0.04733401581334311)

Rank 9: (statement 3, suspiciousness = 0.03608625745695088)

Rank 10: (statement 6, suspiciousness = 0.034179657965841416)

Rank 11: (statement 2, suspiciousness = 0.026461041870086417)

Rank 12: (statement 12, suspiciousness = 0.02506918105654503)

EXAM = 5/12

**Number of test case = 500**

**Buggy program has one bug:**

* **Bug version 1:**

Buggy statement = 5

Rank 1: (statement 5, suspiciousness = 0.7261067809104026)

Rank 2: (statement 1, suspiciousness = 0.6284574833978603)

Rank 3: (statement 9, suspiciousness = 0.12182394657280714)

Rank 4: (statement 10, suspiciousness = 0.09751749437566418)

Rank 5: (statement 11, suspiciousness = 0.09279724580812551)

Rank 6: (statement 4, suspiciousness = 0.0785202352839346)

Rank 7: (statement 7, suspiciousness = 0.07031872461115891)

Rank 8: (statement 8, suspiciousness = 0.0367262927694422)

Rank 9: (statement 12, suspiciousness = 0.033230698290870296)

Rank 10: (statement 3, suspiciousness = 0.03087539195881968)

Rank 11: (statement 6, suspiciousness = 0.030811092439087414)

Rank 12: (statement 2, suspiciousness = 0.022613752781245434)

* **Bug version 2:**

Buggy statement = 7

Rank 1: (statement 7, suspiciousness = 0.7135968935951382)

Rank 2: (statement 6, suspiciousness = 0.17818828065030845)

Rank 3: (statement 11, suspiciousness = 0.16551999450825539)

Rank 4: (statement 10, suspiciousness = 0.15490447778563246)

Rank 5: (statement 5, suspiciousness = 0.13978515670066952)

Rank 6: (statement 9, suspiciousness = 0.11457633844913924)

Rank 7: (statement 1, suspiciousness = 0.09675802156077838)

Rank 8: (statement 4, suspiciousness = 0.047858633294818265)

Rank 9: (statement 8, suspiciousness = 0.04315059081698939)

Rank 10: (statement 2, suspiciousness = 0.021583895786483745)

Rank 11: (statement 12, suspiciousness = 0.018630395080683964)

Rank 12: (statement 3, suspiciousness = 0.01748720488061012)

* **Bug version 3:**

Buggy statement = 9

Rank 1: (statement 9, suspiciousness = 0.7484055759373067)

Rank 2: (statement 1, suspiciousness = 0.24581748778117535)

Rank 3: (statement 7, suspiciousness = 0.11357455476750182)

Rank 4: (statement 11, suspiciousness = 0.08624724441638783)

Rank 5: (statement 5, suspiciousness = 0.08147224954282278)

Rank 6: (statement 8, suspiciousness = 0.06564030043415191)

Rank 7: (statement 6, suspiciousness = 0.06543908156019386)

Rank 8: (statement 4, suspiciousness = 0.04309633088087803)

Rank 9: (statement 3, suspiciousness = 0.0350549660654417)

Rank 10: (statement 10, suspiciousness = 0.02391915980732874)

Rank 11: (statement 2, suspiciousness = 0.021596247533806623)

Rank 12: (statement 12, suspiciousness = 0.013042163054246325)

* **Bug version 4:**

Buggy statement = 11

Rank 1: (statement 11, suspiciousness = 0.691617430895099)

Rank 2: (statement 7, suspiciousness = 0.2100402524406247)

Rank 3: (statement 1, suspiciousness = 0.13094419565201545)

Rank 4: (statement 10, suspiciousness = 0.10612517430704672)

Rank 5: (statement 4, suspiciousness = 0.0909858058672546)

Rank 6: (statement 6, suspiciousness = 0.08103826951878726)

Rank 7: (statement 9, suspiciousness = 0.07960998752449082)

Rank 8: (statement 8, suspiciousness = 0.06227308534794938)

Rank 9: (statement 5, suspiciousness = 0.04460785250683282)

Rank 10: (statement 3, suspiciousness = 0.022655856463577817)

Rank 11: (statement 12, suspiciousness = 0.017512620874618065)

Rank 12: (statement 2, suspiciousness = 0.014595982717136639)

**Buggy program has two bugs:**

* **Bug version 1:**

Buggy statement = 5, 7

Rank 1: (statement 7, suspiciousness = 0.8189353240951023)

Rank 2: (statement 5, suspiciousness = 0.6811349391897809)

Rank 3: (statement 1, suspiciousness = 0.5144174096264741)

Rank 4: (statement 9, suspiciousness = 0.15813412210010613)

Rank 5: (statement 11, suspiciousness = 0.1351310717983463)

Rank 6: (statement 4, suspiciousness = 0.08367103394873351)

Rank 7: (statement 10, suspiciousness = 0.08328859614678999)

Rank 8: (statement 6, suspiciousness = 0.03817283845394112)

Rank 9: (statement 12, suspiciousness = 0.025742105487924636)

Rank 10: (statement 8, suspiciousness = 0.025665871909017705)

Rank 11: (statement 2, suspiciousness = 0.024786664140207307)

Rank 12: (statement 3, suspiciousness = 0.02312965259295136)

* **Bug version 2:**

Buggy statement = 5, 9

Rank 1: (statement 9, suspiciousness = 0.6742802889275842)

Rank 2: (statement 5, suspiciousness = 0.6418391382995655)

Rank 3: (statement 1, suspiciousness = 0.23281672361759348)

Rank 4: (statement 11, suspiciousness = 0.10671565089319615)

Rank 5: (statement 4, suspiciousness = 0.09804775757607144)

Rank 6: (statement 8, suspiciousness = 0.0805860132416494)

Rank 7: (statement 7, suspiciousness = 0.06007907346330558)

Rank 8: (statement 2, suspiciousness = 0.03705958453244836)

Rank 9: (statement 6, suspiciousness = 0.024574796842503365)

Rank 10: (statement 3, suspiciousness = 0.02020301061020455)

Rank 11: (statement 12, suspiciousness = 0.019182925419709188)

Rank 12: (statement 10, suspiciousness = 0.017941195596064562)

* **Bug version 3:**

Buggy statement = 5, 11

Rank 1: (statement 5, suspiciousness = 0.5481485069759474)

Rank 2: (statement 11, suspiciousness = 0.4953970302085649)

Rank 3: (statement 10, suspiciousness = 0.17915473963865516)

Rank 4: (statement 1, suspiciousness = 0.09059774749807126)

Rank 5: (statement 9, suspiciousness = 0.058363841373942044)

Rank 6: (statement 4, suspiciousness = 0.05037029048953601)

Rank 7: (statement 7, suspiciousness = 0.03827445258275451)

Rank 8: (statement 6, suspiciousness = 0.037716857466527566)

Rank 9: (statement 2, suspiciousness = 0.02701619360044402)

Rank 10: (statement 8, suspiciousness = 0.024975308135804387)

Rank 11: (statement 3, suspiciousness = 0.01717131218249112)

Rank 12: (statement 12, suspiciousness = 0.01691466460817226)

* **Bug version 4:**

Buggy statement = 7, 9

Rank 1: (statement 7, suspiciousness = 0.8679814576297115)

Rank 2: (statement 9, suspiciousness = 0.6974853355023286)

Rank 3: (statement 1, suspiciousness = 0.17811818480872618)

Rank 4: (statement 11, suspiciousness = 0.12976876901114914)

Rank 5: (statement 8, suspiciousness = 0.09907861432325261)

Rank 6: (statement 6, suspiciousness = 0.09128533687218371)

Rank 7: (statement 5, suspiciousness = 0.05791435178809779)

Rank 8: (statement 4, suspiciousness = 0.039300932164075035)

Rank 9: (statement 10, suspiciousness = 0.024658190245156968)

Rank 10: (statement 2, suspiciousness = 0.020469945830565318)

Rank 11: (statement 12, suspiciousness = 0.02011847034912501)

Rank 12: (statement 3, suspiciousness = 0.018699512895173017)

* **Bug version 5:**

Buggy statement = 7, 11

Rank 1: (statement 11, suspiciousness = 0.7546170470468432)

Rank 2: (statement 7, suspiciousness = 0.6121357639594961)

Rank 3: (statement 6, suspiciousness = 0.1515980596960293)

Rank 4: (statement 10, suspiciousness = 0.13331825132525216)

Rank 5: (statement 1, suspiciousness = 0.11344841295574162)

Rank 6: (statement 5, suspiciousness = 0.09894690344531087)

Rank 7: (statement 9, suspiciousness = 0.06878552674936546)

Rank 8: (statement 4, suspiciousness = 0.05966356739938438)

Rank 9: (statement 8, suspiciousness = 0.047297371585933126)

Rank 10: (statement 3, suspiciousness = 0.023386551283693928)

Rank 11: (statement 2, suspiciousness = 0.02074383606572361)

Rank 12: (statement 12, suspiciousness = 0.019214107063540473)

* **Bug version 6:**

Buggy statement = 9, 11

Rank 1: (statement 11, suspiciousness = 0.8942331808324101)

Rank 2: (statement 9, suspiciousness = 0.6674933033325159)

Rank 3: (statement 1, suspiciousness = 0.5050784668229841)

Rank 4: (statement 7, suspiciousness = 0.18793086176203985)

Rank 5: (statement 5, suspiciousness = 0.11480252137294587)

Rank 6: (statement 8, suspiciousness = 0.08689140935346389)

Rank 7: (statement 6, suspiciousness = 0.08412136372206762)

Rank 8: (statement 4, suspiciousness = 0.034721183127206276)

Rank 9: (statement 3, suspiciousness = 0.032754390754680535)

Rank 10: (statement 12, suspiciousness = 0.02808485100654469)

Rank 11: (statement 10, suspiciousness = 0.026650486237787853)

Rank 12: (statement 2, suspiciousness = 0.02370505914244852)

**Buggy program has three bugs:**

* **Bug version 1:**

Buggy statement = 5, 7, 9

Rank 1: (statement 7, suspiciousness = 0.8406526259976246)

Rank 2: (statement 9, suspiciousness = 0.7895270085124935)

Rank 3: (statement 5, suspiciousness = 0.7362174323118719)

Rank 4: (statement 1, suspiciousness = 0.4768911064194347)

Rank 5: (statement 11, suspiciousness = 0.1361320620698991)

Rank 6: (statement 4, suspiciousness = 0.08749135690748418)

Rank 7: (statement 8, suspiciousness = 0.06968127879965262)

Rank 8: (statement 6, suspiciousness = 0.05807999675961973)

Rank 9: (statement 3, suspiciousness = 0.033610958986906636)

Rank 10: (statement 10, suspiciousness = 0.02503760438488628)

Rank 11: (statement 2, suspiciousness = 0.021047459771481692)

Rank 12: (statement 12, suspiciousness = 0.017320033736066318)

* **Bug version 2:**

Buggy statement = 5, 9, 11

Rank 1: (statement 11, suspiciousness = 0.8924791194090866)

Rank 2: (statement 9, suspiciousness = 0.6417781229230927)

Rank 3: (statement 5, suspiciousness = 0.5698256963911965)

Rank 4: (statement 1, suspiciousness = 0.24481742789836133)

Rank 5: (statement 4, suspiciousness = 0.16603112177643758)

Rank 6: (statement 8, suspiciousness = 0.07998925883011283)

Rank 7: (statement 7, suspiciousness = 0.041044742209690795)

Rank 8: (statement 3, suspiciousness = 0.02217555060388275)

Rank 9: (statement 2, suspiciousness = 0.020374686141928375)

Rank 10: (statement 10, suspiciousness = 0.01909710610432063)

Rank 11: (statement 12, suspiciousness = 0.018801272649066513)

Rank 12: (statement 6, suspiciousness = 0.015231290517945941)

* **Bug version 3:**

Buggy statement = 7, 9, 11

Rank 1: (statement 7, suspiciousness = 0.9280059100738068)

Rank 2: (statement 11, suspiciousness = 0.8815834252025638)

Rank 3: (statement 9, suspiciousness = 0.6624510687287792)

Rank 4: (statement 1, suspiciousness = 0.2901790343541813)

Rank 5: (statement 6, suspiciousness = 0.1741419930536443)

Rank 6: (statement 8, suspiciousness = 0.10747778524325527)

Rank 7: (statement 5, suspiciousness = 0.06145565770355289)

Rank 8: (statement 10, suspiciousness = 0.04208886318471458)

Rank 9: (statement 12, suspiciousness = 0.036328974855432086)

Rank 10: (statement 4, suspiciousness = 0.03052340294431085)

Rank 11: (statement 3, suspiciousness = 0.02611811388588258)

Rank 12: (statement 2, suspiciousness = 0.023283428757648217)

* **Bug version 4:**

Buggy statement = 5, 7, 11

Rank 1: (statement 11, suspiciousness = 0.8359150826464072)

Rank 2: (statement 5, suspiciousness = 0.8268028468078579)

Rank 3: (statement 7, suspiciousness = 0.8080814766014417)

Rank 4: (statement 1, suspiciousness = 0.5915582046816962)

Rank 5: (statement 10, suspiciousness = 0.1949970650676497)

Rank 6: (statement 4, suspiciousness = 0.1328992834334882)

Rank 7: (statement 9, suspiciousness = 0.09695776076484375)

Rank 8: (statement 6, suspiciousness = 0.05838201931599722)

Rank 9: (statement 8, suspiciousness = 0.03979994010631844)

Rank 10: (statement 3, suspiciousness = 0.033971480067386275)

Rank 11: (statement 12, suspiciousness = 0.025697451511341705)

Rank 12: (statement 2, suspiciousness = 0.02056924971062967)

**Buggy program has four bugs:**

* **Bug version 1:**

Buggy statement = 5, 7, 9, 11

Rank 1: (statement 7, suspiciousness = 0.7665172626665213)

Rank 2: (statement 11, suspiciousness = 0.7646387031092566)

Rank 3: (statement 9, suspiciousness = 0.6354124723245401)

Rank 4: (statement 5, suspiciousness = 0.5860766454045561)

Rank 5: (statement 1, suspiciousness = 0.2369178232483872)

Rank 6: (statement 4, suspiciousness = 0.07744643823888489)

Rank 7: (statement 8, suspiciousness = 0.06920859036668288)

Rank 8: (statement 6, suspiciousness = 0.050575605852238456)

Rank 9: (statement 3, suspiciousness = 0.03979865789997715)

Rank 10: (statement 10, suspiciousness = 0.029203198757639347)

Rank 11: (statement 12, suspiciousness = 0.023326541779050088)

Rank 12: (statement 2, suspiciousness = 0.021670108905847703)

**Number of test case = 1000**

**Buggy program has one bug:**

* **Bug version 1:**

Buggy statement = 5

Rank 1: (statement 5, suspiciousness = 0.3072489841991257)

Rank 2: (statement 1, suspiciousness = 0.0982173009978544)

Rank 3: (statement 7, suspiciousness = 0.0447369924201688)

Rank 4: (statement 10, suspiciousness = 0.044109743556988976)

Rank 5: (statement 9, suspiciousness = 0.04350139236297083)

Rank 6: (statement 11, suspiciousness = 0.04209114419997638)

Rank 7: (statement 4, suspiciousness = 0.025377613345319457)

Rank 8: (statement 3, suspiciousness = 0.01911880337638013)

Rank 9: (statement 12, suspiciousness = 0.01900591146257952)

Rank 10: (statement 2, suspiciousness = 0.018131743730580584)

Rank 11: (statement 6, suspiciousness = 0.017227325196697344)

Rank 12: (statement 8, suspiciousness = 0.017170598403787266)

* **Bug version 2:**

Buggy statement = 7

Rank 1: (statement 7, suspiciousness = 0.8500100646363522)

Rank 2: (statement 1, suspiciousness = 0.3556493865808059)

Rank 3: (statement 9, suspiciousness = 0.14568017240850567)

Rank 4: (statement 11, suspiciousness = 0.13841646997659401)

Rank 5: (statement 6, suspiciousness = 0.1306039187581563)

Rank 6: (statement 10, suspiciousness = 0.07225935817509116)

Rank 7: (statement 5, suspiciousness = 0.06615430205190717)

Rank 8: (statement 8, suspiciousness = 0.03712220311662905)

Rank 9: (statement 12, suspiciousness = 0.028931002715588707)

Rank 10: (statement 4, suspiciousness = 0.026695061192674924)

Rank 11: (statement 3, suspiciousness = 0.02205648898194226)

Rank 12: (statement 2, suspiciousness = 0.016544676480701404)

* **Bug version 3:**

Buggy statement = 9

Rank 1: (statement 9, suspiciousness = 0.6524202442824188)

Rank 2: (statement 1, suspiciousness = 0.20469423994600952)

Rank 3: (statement 7, suspiciousness = 0.17369417700515868)

Rank 4: (statement 5, suspiciousness = 0.09968369319114657)

Rank 5: (statement 8, suspiciousness = 0.09775995691142693)

Rank 6: (statement 6, suspiciousness = 0.0889316348491629)

Rank 7: (statement 11, suspiciousness = 0.06942742752768342)

Rank 8: (statement 12, suspiciousness = 0.028220214051811653)

Rank 9: (statement 4, suspiciousness = 0.02779545091190266)

Rank 10: (statement 10, suspiciousness = 0.018917649411288203)

Rank 11: (statement 3, suspiciousness = 0.018698867217910822)

Rank 12: (statement 2, suspiciousness = 0.01620438053936865)

* **Bug version 4:**

Buggy statement = 11

Rank 1: (statement 11, suspiciousness = 0.8899557391505039)

Rank 2: (statement 10, suspiciousness = 0.27343297830101226)

Rank 3: (statement 7, suspiciousness = 0.21527751794238756)

Rank 4: (statement 1, suspiciousness = 0.14870021031758657)

Rank 5: (statement 5, suspiciousness = 0.14359542673031808)

Rank 6: (statement 6, suspiciousness = 0.13955839849209148)

Rank 7: (statement 9, suspiciousness = 0.1026580866625965)

Rank 8: (statement 4, suspiciousness = 0.07768879297482756)

Rank 9: (statement 8, suspiciousness = 0.04322016704611928)

Rank 10: (statement 3, suspiciousness = 0.021658180545050133)

Rank 11: (statement 2, suspiciousness = 0.01747981387444613)

Rank 12: (statement 12, suspiciousness = 0.016023826840670264)

**Buggy program has two bugs:**

* **Bug version 1:**

Buggy statement = 5, 7

Rank 1: (statement 7, suspiciousness = 0.8997842546579896)

Rank 2: (statement 5, suspiciousness = 0.7794759743456895)

Rank 3: (statement 1, suspiciousness = 0.16366984935994947)

Rank 4: (statement 11, suspiciousness = 0.15371030885874434)

Rank 5: (statement 4, suspiciousness = 0.13575630915545028)

Rank 6: (statement 9, suspiciousness = 0.13426254295444587)

Rank 7: (statement 10, suspiciousness = 0.06390149305519635)

Rank 8: (statement 8, suspiciousness = 0.03816286717204994)

Rank 9: (statement 6, suspiciousness = 0.025995866915363004)

Rank 10: (statement 12, suspiciousness = 0.023093995285746866)

Rank 11: (statement 3, suspiciousness = 0.020155017820555655)

Rank 12: (statement 2, suspiciousness = 0.018562023747848218)

* **Bug version 2:**

Buggy statement = 5, 9

Rank 1: (statement 9, suspiciousness = 0.8381507017839431)

Rank 2: (statement 5, suspiciousness = 0.8253143503233108)

Rank 3: (statement 1, suspiciousness = 0.3717113930026884)

Rank 4: (statement 7, suspiciousness = 0.047194203480100484)

Rank 5: (statement 8, suspiciousness = 0.04243602766498332)

Rank 6: (statement 4, suspiciousness = 0.037872774416269)

Rank 7: (statement 11, suspiciousness = 0.036720488215064996)

Rank 8: (statement 12, suspiciousness = 0.02240653809857495)

Rank 9: (statement 3, suspiciousness = 0.020283660192306253)

Rank 10: (statement 2, suspiciousness = 0.01975865279256075)

Rank 11: (statement 10, suspiciousness = 0.014942988146168016)

Rank 12: (statement 6, suspiciousness = 0.014282047023792791)

* **Bug version 3:**

Buggy statement = 5, 11

Rank 1: (statement 11, suspiciousness = 0.40253439555575826)

Rank 2: (statement 5, suspiciousness = 0.3773888711830293)

Rank 3: (statement 10, suspiciousness = 0.07209910498528796)

Rank 4: (statement 7, suspiciousness = 0.04575974980993847)

Rank 5: (statement 1, suspiciousness = 0.04266910266256533)

Rank 6: (statement 4, suspiciousness = 0.037333325136052815)

Rank 7: (statement 9, suspiciousness = 0.02309802228754452)

Rank 8: (statement 8, suspiciousness = 0.01850079020114816)

Rank 9: (statement 2, suspiciousness = 0.017091336944613476)

Rank 10: (statement 3, suspiciousness = 0.01629902564524288)

Rank 11: (statement 12, suspiciousness = 0.014818099305539399)

Rank 12: (statement 6, suspiciousness = 0.014072192217764993)

* **Bug version 4:**

Buggy statement = 7, 9

Rank 1: (statement 7, suspiciousness = 0.9467643572485958)

Rank 2: (statement 9, suspiciousness = 0.9112231208419534)

Rank 3: (statement 1, suspiciousness = 0.36938310421341924)

Rank 4: (statement 6, suspiciousness = 0.14519272689672874)

Rank 5: (statement 8, suspiciousness = 0.11932737538870278)

Rank 6: (statement 11, suspiciousness = 0.11547303978109227)

Rank 7: (statement 5, suspiciousness = 0.05934195992413347)

Rank 8: (statement 4, suspiciousness = 0.03233947437118631)

Rank 9: (statement 10, suspiciousness = 0.02140089490375029)

Rank 10: (statement 12, suspiciousness = 0.020784432159197622)

Rank 11: (statement 3, suspiciousness = 0.0188774859028048)

Rank 12: (statement 2, suspiciousness = 0.01875666643778661)

* **Bug version 5:**

Buggy statement = 7, 11

Rank 1: (statement 11, suspiciousness = 0.99461298360108)

Rank 2: (statement 7, suspiciousness = 0.9659136222582493)

Rank 3: (statement 6, suspiciousness = 0.46506984599639384)

Rank 4: (statement 10, suspiciousness = 0.46259391029071817)

Rank 5: (statement 5, suspiciousness = 0.36803425316168414)

Rank 6: (statement 1, suspiciousness = 0.3447947642575685)

Rank 7: (statement 9, suspiciousness = 0.17643736105528648)

Rank 8: (statement 8, suspiciousness = 0.15346872672898146)

Rank 9: (statement 4, suspiciousness = 0.09001582043161424)

Rank 10: (statement 2, suspiciousness = 0.026271223532746624)

Rank 11: (statement 3, suspiciousness = 0.02602487288630496)

Rank 12: (statement 12, suspiciousness = 0.014075036058062238)

* **Bug version 6:**

Buggy statement = 9, 11

Rank 1: (statement 11, suspiciousness = 0.9015322684370518)

Rank 2: (statement 9, suspiciousness = 0.8520526176016832)

Rank 3: (statement 1, suspiciousness = 0.31410729544431093)

Rank 4: (statement 8, suspiciousness = 0.2089759200419318)

Rank 5: (statement 7, suspiciousness = 0.08181252184222416)

Rank 6: (statement 5, suspiciousness = 0.06919914086131941)

Rank 7: (statement 6, suspiciousness = 0.06842783893243341)

Rank 8: (statement 4, suspiciousness = 0.05233856300812869)

Rank 9: (statement 10, suspiciousness = 0.02803379602590812)

Rank 10: (statement 3, suspiciousness = 0.021973105637234043)

Rank 11: (statement 12, suspiciousness = 0.018463970397722247)

Rank 12: (statement 2, suspiciousness = 0.01556655951122595)

**Buggy program has three bugs:**

* **Bug version 1:**

Buggy statement = 5, 7, 9

Rank 1: (statement 7, suspiciousness = 0.9726856728567929)

Rank 2: (statement 9, suspiciousness = 0.8967254569503497)

Rank 3: (statement 5, suspiciousness = 0.8867175749282925)

Rank 4: (statement 1, suspiciousness = 0.3456630020281737)

Rank 5: (statement 8, suspiciousness = 0.13716492448198678)

Rank 6: (statement 4, suspiciousness = 0.13168230405639023)

Rank 7: (statement 11, suspiciousness = 0.07053322514694678)

Rank 8: (statement 2, suspiciousness = 0.02540331814269481)

Rank 9: (statement 6, suspiciousness = 0.02241687565184103)

Rank 10: (statement 10, suspiciousness = 0.022082341426381893)

Rank 11: (statement 3, suspiciousness = 0.019929683985729273)

Rank 12: (statement 12, suspiciousness = 0.018164016965650103)

* **Bug version 2:**

Buggy statement = 5, 9, 11

Rank 1: (statement 11, suspiciousness = 0.9540039648666401)

Rank 2: (statement 5, suspiciousness = 0.8938454954995061)

Rank 3: (statement 9, suspiciousness = 0.8706437823450591)

Rank 4: (statement 1, suspiciousness = 0.4687722466487813)

Rank 5: (statement 8, suspiciousness = 0.08518522426231116)

Rank 6: (statement 4, suspiciousness = 0.055951025623637456)

Rank 7: (statement 7, suspiciousness = 0.04399639082714144)

Rank 8: (statement 2, suspiciousness = 0.02306546702702118)

Rank 9: (statement 3, suspiciousness = 0.02211560842323105)

Rank 10: (statement 12, suspiciousness = 0.01637852846270478)

Rank 11: (statement 6, suspiciousness = 0.016340300342451743)

Rank 12: (statement 10, suspiciousness = 0.015084318328980148)

* **Bug version 3:**

Buggy statement = 7, 9, 11

Rank 1: (statement 7, suspiciousness = 0.9535142704499552)

Rank 2: (statement 11, suspiciousness = 0.9474290009729471)

Rank 3: (statement 9, suspiciousness = 0.8966234350543206)

Rank 4: (statement 1, suspiciousness = 0.36327547748322875)

Rank 5: (statement 6, suspiciousness = 0.16887808385227798)

Rank 6: (statement 8, suspiciousness = 0.13314652930215823)

Rank 7: (statement 5, suspiciousness = 0.049994563119417565)

Rank 8: (statement 4, suspiciousness = 0.03706750707429585)

Rank 9: (statement 12, suspiciousness = 0.03233649237127362)

Rank 10: (statement 10, suspiciousness = 0.027179919649708346)

Rank 11: (statement 3, suspiciousness = 0.019050667190860213)

Rank 12: (statement 2, suspiciousness = 0.016146640212870714)

* **Bug version 4:**

Buggy statement = 5, 7, 11

Rank 1: (statement 11, suspiciousness = 0.9329772046899124)

Rank 2: (statement 7, suspiciousness = 0.9148810662281573)

Rank 3: (statement 5, suspiciousness = 0.7726452428323545)

Rank 4: (statement 4, suspiciousness = 0.3182492229883589)

Rank 5: (statement 1, suspiciousness = 0.27517695790350893)

Rank 6: (statement 10, suspiciousness = 0.17549707521345093)

Rank 7: (statement 9, suspiciousness = 0.055425630519064045)

Rank 8: (statement 8, suspiciousness = 0.029591248374101053)

Rank 9: (statement 6, suspiciousness = 0.026285153160351574)

Rank 10: (statement 3, suspiciousness = 0.02048772445113569)

Rank 11: (statement 2, suspiciousness = 0.01877711440287608)

Rank 12: (statement 12, suspiciousness = 0.018730804343126517)

**Buggy program has four bugs:**

* **Bug version 1:**

Buggy statement = 5, 7, 9, 11

Rank 1: (statement 7, suspiciousness = 0.9777618580652307)

Rank 2: (statement 11, suspiciousness = 0.9689785133743752)

Rank 3: (statement 5, suspiciousness = 0.9068214226064809)

Rank 4: (statement 9, suspiciousness = 0.8861667424591392)

Rank 5: (statement 1, suspiciousness = 0.4998200284501794)

Rank 6: (statement 8, suspiciousness = 0.14121863191496525)

Rank 7: (statement 4, suspiciousness = 0.07081071899392975)

Rank 8: (statement 6, suspiciousness = 0.026515883816072616)

Rank 9: (statement 3, suspiciousness = 0.025001682361100303)

Rank 10: (statement 2, suspiciousness = 0.022822762958319236)

Rank 11: (statement 12, suspiciousness = 0.022126937579344218)

Rank 12: (statement 10, suspiciousness = 0.018689333834917752)

**Number of test case = 2000**

**Buggy program has one bug:**

* **Bug version 1:**

Buggy statement = 5

Rank 1: (statement 5, suspiciousness = 0.9310339518079959)

Rank 2: (statement 1, suspiciousness = 0.48442472689028987)

Rank 3: (statement 11, suspiciousness = 0.37671487194316083)

Rank 4: (statement 9, suspiciousness = 0.21836127468691177)

Rank 5: (statement 4, suspiciousness = 0.11828304439392043)

Rank 6: (statement 10, suspiciousness = 0.10055906652164492)

Rank 7: (statement 7, suspiciousness = 0.06843722609805318)

Rank 8: (statement 8, suspiciousness = 0.0380900176779689)

Rank 9: (statement 6, suspiciousness = 0.02823836052537416)

Rank 10: (statement 2, suspiciousness = 0.018804102374327076)

Rank 11: (statement 12, suspiciousness = 0.016315343174185818)

Rank 12: (statement 3, suspiciousness = 0.01588935643785218)

* **Bug version 2:**

Buggy statement = 7

Rank 1: (statement 7, suspiciousness = 0.9617421674972291)

Rank 2: (statement 1, suspiciousness = 0.40900571699788774)

Rank 3: (statement 11, suspiciousness = 0.2113439618845951)

Rank 4: (statement 6, suspiciousness = 0.18478306109445344)

Rank 5: (statement 9, suspiciousness = 0.18059013291842704)

Rank 6: (statement 10, suspiciousness = 0.17834090777512143)

Rank 7: (statement 5, suspiciousness = 0.13513399520532818)

Rank 8: (statement 8, suspiciousness = 0.11339211643898311)

Rank 9: (statement 4, suspiciousness = 0.07777238471059753)

Rank 10: (statement 12, suspiciousness = 0.02128591380793374)

Rank 11: (statement 2, suspiciousness = 0.019881721097687138)

Rank 12: (statement 3, suspiciousness = 0.019195906252384477)

* **Bug version 3:**

Buggy statement = 9

Rank 1: (statement 9, suspiciousness = 0.8579567302671376)

Rank 2: (statement 1, suspiciousness = 0.33855223889793135)

Rank 3: (statement 7, suspiciousness = 0.13710337774481546)

Rank 4: (statement 5, suspiciousness = 0.09802983345410722)

Rank 5: (statement 8, suspiciousness = 0.08881965907699366)

Rank 6: (statement 6, suspiciousness = 0.06059279809745716)

Rank 7: (statement 11, suspiciousness = 0.05015277709424899)

Rank 8: (statement 4, suspiciousness = 0.02927488919258741)

Rank 9: (statement 12, suspiciousness = 0.021557840677354542)

Rank 10: (statement 3, suspiciousness = 0.017885686911240047)

Rank 11: (statement 2, suspiciousness = 0.0172128200792548)

Rank 12: (statement 10, suspiciousness = 0.01652913518689353)

* **Bug version 4:**

Buggy statement = 11

Rank 1: (statement 11, suspiciousness = 0.6078966725211591)

Rank 2: (statement 1, suspiciousness = 0.23395412060494758)

Rank 3: (statement 10, suspiciousness = 0.1061773768708151)

Rank 4: (statement 7, suspiciousness = 0.0982109466166111)

Rank 5: (statement 5, suspiciousness = 0.08864692464942157)

Rank 6: (statement 9, suspiciousness = 0.07446164190081885)

Rank 7: (statement 6, suspiciousness = 0.05629265589436967)

Rank 8: (statement 4, suspiciousness = 0.048191520151431466)

Rank 9: (statement 8, suspiciousness = 0.03280015616835046)

Rank 10: (statement 2, suspiciousness = 0.025796111137235213)

Rank 11: (statement 3, suspiciousness = 0.021441873398922156)

Rank 12: (statement 12, suspiciousness = 0.017732555643029994)

**Buggy program has two bugs:**

* **Bug version 1:**

Buggy statement = 5, 7

Rank 1: (statement 7, suspiciousness = 0.7931138117500742)

Rank 2: (statement 5, suspiciousness = 0.6463472869889205)

Rank 3: (statement 11, suspiciousness = 0.2343557556122445)

Rank 4: (statement 1, suspiciousness = 0.19714446992573723)

Rank 5: (statement 4, suspiciousness = 0.1046459883576667)

Rank 6: (statement 9, suspiciousness = 0.0944884164019312)

Rank 7: (statement 10, suspiciousness = 0.0697407302311842)

Rank 8: (statement 3, suspiciousness = 0.06613848348704192)

Rank 9: (statement 8, suspiciousness = 0.028780989225284586)

Rank 10: (statement 12, suspiciousness = 0.027448774131143827)

Rank 11: (statement 2, suspiciousness = 0.02612923552578802)

Rank 12: (statement 6, suspiciousness = 0.020183799582312405)

* **Bug version 2:**

Buggy statement = 5, 9

Rank 1: (statement 9, suspiciousness = 0.8938450014639309)

Rank 2: (statement 5, suspiciousness = 0.8564679124522433)

Rank 3: (statement 1, suspiciousness = 0.15769646429048273)

Rank 4: (statement 7, suspiciousness = 0.08647097347526642)

Rank 5: (statement 11, suspiciousness = 0.0698166546203821)

Rank 6: (statement 4, suspiciousness = 0.06738900716950426)

Rank 7: (statement 8, suspiciousness = 0.03872413561227882)

Rank 8: (statement 2, suspiciousness = 0.03345025922877066)

Rank 9: (statement 6, suspiciousness = 0.017294257497251244)

Rank 10: (statement 3, suspiciousness = 0.01699248143140405)

Rank 11: (statement 12, suspiciousness = 0.01657520804840305)

Rank 12: (statement 10, suspiciousness = 0.015073290087236403)

* **Bug version 3:**

Buggy statement = 5, 11

Rank 1: (statement 11, suspiciousness = 0.9585593568065385)

Rank 2: (statement 5, suspiciousness = 0.9277859451091112)

Rank 3: (statement 1, suspiciousness = 0.18962007762854896)

Rank 4: (statement 10, suspiciousness = 0.09424480268252093)

Rank 5: (statement 4, suspiciousness = 0.09255826073449569)

Rank 6: (statement 7, suspiciousness = 0.062438995093813364)

Rank 7: (statement 9, suspiciousness = 0.03886079667363452)

Rank 8: (statement 8, suspiciousness = 0.03412476132028629)

Rank 9: (statement 2, suspiciousness = 0.02088998482169431)

Rank 10: (statement 6, suspiciousness = 0.01958335321372239)

Rank 11: (statement 3, suspiciousness = 0.018808530750451895)

Rank 12: (statement 12, suspiciousness = 0.016620806960652476)

* **Bug version 4:**

Buggy statement = 7, 9

Rank 1: (statement 7, suspiciousness = 0.9382243378022673)

Rank 2: (statement 9, suspiciousness = 0.9112027431480125)

Rank 3: (statement 1, suspiciousness = 0.220178785798518)

Rank 4: (statement 8, suspiciousness = 0.12517807644190182)

Rank 5: (statement 6, suspiciousness = 0.09112885450555826)

Rank 6: (statement 11, suspiciousness = 0.07494208828162001)

Rank 7: (statement 5, suspiciousness = 0.05663339067303676)

Rank 8: (statement 4, suspiciousness = 0.027524034697970143)

Rank 9: (statement 3, suspiciousness = 0.020597497334960652)

Rank 10: (statement 10, suspiciousness = 0.018621474886768623)

Rank 11: (statement 2, suspiciousness = 0.016964356803695145)

Rank 12: (statement 12, suspiciousness = 0.01534405719610067)

* **Bug version 5:**

Buggy statement = 7, 11

Rank 1: (statement 11, suspiciousness = 0.9232848053351301)

Rank 2: (statement 7, suspiciousness = 0.9220414278890928)

Rank 3: (statement 1, suspiciousness = 0.21664946978548724)

Rank 4: (statement 6, suspiciousness = 0.17078165938350143)

Rank 5: (statement 10, suspiciousness = 0.15626141921252934)

Rank 6: (statement 9, suspiciousness = 0.11635671391898726)

Rank 7: (statement 5, suspiciousness = 0.07355093104333024)

Rank 8: (statement 8, suspiciousness = 0.04623344896861373)

Rank 9: (statement 4, suspiciousness = 0.03818552834927902)

Rank 10: (statement 3, suspiciousness = 0.021857562237129133)

Rank 11: (statement 2, suspiciousness = 0.02032074331827385)

Rank 12: (statement 12, suspiciousness = 0.014150222939614007)

* **Bug version 6:**

Buggy statement = 9, 11

Rank 1: (statement 11, suspiciousness = 0.9421482389187487)

Rank 2: (statement 9, suspiciousness = 0.8225953903063621)

Rank 3: (statement 1, suspiciousness = 0.2632252307233085)

Rank 4: (statement 7, suspiciousness = 0.23478777195611045)

Rank 5: (statement 5, suspiciousness = 0.17662501214857595)

Rank 6: (statement 8, suspiciousness = 0.1590885364548247)

Rank 7: (statement 6, suspiciousness = 0.09119168723116489)

Rank 8: (statement 4, suspiciousness = 0.023443323486046014)

Rank 9: (statement 12, suspiciousness = 0.02331712455448342)

Rank 10: (statement 3, suspiciousness = 0.021674087861477665)

Rank 11: (statement 2, suspiciousness = 0.015616040538616071)

Rank 12: (statement 10, suspiciousness = 0.01557194819116802)

**Buggy program has three bugs:**

* **Bug version 1:**

Buggy statement = 5, 7, 9

Rank 1: (statement 7, suspiciousness = 0.9542622447003387)

Rank 2: (statement 5, suspiciousness = 0.8897369767969499)

Rank 3: (statement 9, suspiciousness = 0.8840885161091854)

Rank 4: (statement 1, suspiciousness = 0.5737853365847999)

Rank 5: (statement 8, suspiciousness = 0.09665456342287856)

Rank 6: (statement 4, suspiciousness = 0.08709337125937464)

Rank 7: (statement 11, suspiciousness = 0.05747299641680792)

Rank 8: (statement 2, suspiciousness = 0.0389176329771506)

Rank 9: (statement 3, suspiciousness = 0.019377153417195467)

Rank 10: (statement 6, suspiciousness = 0.01839981987990968)

Rank 11: (statement 12, suspiciousness = 0.015991162701857554)

Rank 12: (statement 10, suspiciousness = 0.014252357310403464)

* **Bug version 2:**

Buggy statement = 5, 9, 11

Rank 1: (statement 11, suspiciousness = 0.9790965336256107)

Rank 2: (statement 9, suspiciousness = 0.9431931189133761)

Rank 3: (statement 5, suspiciousness = 0.9086521128206214)

Rank 4: (statement 1, suspiciousness = 0.41229027458211226)

Rank 5: (statement 7, suspiciousness = 0.09045969585970161)

Rank 6: (statement 4, suspiciousness = 0.07437139865439711)

Rank 7: (statement 8, suspiciousness = 0.07183930857316033)

Rank 8: (statement 12, suspiciousness = 0.03564021139456707)

Rank 9: (statement 6, suspiciousness = 0.020291573944591912)

Rank 10: (statement 2, suspiciousness = 0.018433676686272094)

Rank 11: (statement 10, suspiciousness = 0.017966964467540498)

Rank 12: (statement 3, suspiciousness = 0.017892527191322064)

* **Bug version 3:**

Buggy statement = 7, 9, 11

Rank 1: (statement 7, suspiciousness = 0.9136234235004789)

Rank 2: (statement 11, suspiciousness = 0.8990552226573303)

Rank 3: (statement 9, suspiciousness = 0.864897724035307)

Rank 4: (statement 8, suspiciousness = 0.43390749527370914)

Rank 5: (statement 1, suspiciousness = 0.2884273017358404)

Rank 6: (statement 6, suspiciousness = 0.09555809288812697)

Rank 7: (statement 5, suspiciousness = 0.03545136525142683)

Rank 8: (statement 4, suspiciousness = 0.02374905913421288)

Rank 9: (statement 3, suspiciousness = 0.01689998662922414)

Rank 10: (statement 10, suspiciousness = 0.016305370611173757)

Rank 11: (statement 12, suspiciousness = 0.015235226943501315)

Rank 12: (statement 2, suspiciousness = 0.013575275692688184)

* **Bug version 4:**

Buggy statement = 5, 7, 11

Rank 1: (statement 7, suspiciousness = 0.9614936698872829)

Rank 2: (statement 11, suspiciousness = 0.9579351678516937)

Rank 3: (statement 5, suspiciousness = 0.9175149266653377)

Rank 4: (statement 1, suspiciousness = 0.4474619273319296)

Rank 5: (statement 4, suspiciousness = 0.19926338285504552)

Rank 6: (statement 10, suspiciousness = 0.15249217810925902)

Rank 7: (statement 9, suspiciousness = 0.0401715608320563)

Rank 8: (statement 8, suspiciousness = 0.03484685103845666)

Rank 9: (statement 3, suspiciousness = 0.02104892173675201)

Rank 10: (statement 2, suspiciousness = 0.021000791561485883)

Rank 11: (statement 12, suspiciousness = 0.019640400528538344)

Rank 12: (statement 6, suspiciousness = 0.018776828271894395)

**Buggy program has four bugs:**

* **Bug version 1:**

Buggy statement = 5, 7, 9, 11

Rank 1: (statement 11, suspiciousness = 0.9773932391671379)

Rank 2: (statement 7, suspiciousness = 0.9772817831797852)

Rank 3: (statement 5, suspiciousness = 0.938296546602792)

Rank 4: (statement 9, suspiciousness = 0.8843175707535758)

Rank 5: (statement 1, suspiciousness = 0.6350582225713499)

Rank 6: (statement 8, suspiciousness = 0.13709111997349363)

Rank 7: (statement 4, suspiciousness = 0.061909118605145357)

Rank 8: (statement 2, suspiciousness = 0.026205831907740024)

Rank 9: (statement 3, suspiciousness = 0.02219805590597165)

Rank 10: (statement 12, suspiciousness = 0.017773599027761735)

Rank 11: (statement 6, suspiciousness = 0.0154242365239858)

Rank 12: (statement 10, suspiciousness = 0.014592839448041609)

**Number of test case = 5000**

**Buggy program has one bug:**

* **Bug version 1:**

Buggy statement = 5

Rank 1: (statement 5, suspiciousness = 0.890764387301134)

Rank 2: (statement 1, suspiciousness = 0.27643498927382915)

Rank 3: (statement 9, suspiciousness = 0.1319510644873027)

Rank 4: (statement 11, suspiciousness = 0.12392646280508196)

Rank 5: (statement 10, suspiciousness = 0.10234046633596917)

Rank 6: (statement 7, suspiciousness = 0.0746983338498936)

Rank 7: (statement 4, suspiciousness = 0.06668690643442803)

Rank 8: (statement 8, suspiciousness = 0.024646473032963395)

Rank 9: (statement 3, suspiciousness = 0.0217818796790915)

Rank 10: (statement 2, suspiciousness = 0.01707584837644723)

Rank 11: (statement 6, suspiciousness = 0.015143743820646038)

Rank 12: (statement 12, suspiciousness = 0.01483488295213636)

* **Bug version 2:**

Buggy statement = 7

Rank 1: (statement 7, suspiciousness = 0.9429685508694543)

Rank 2: (statement 1, suspiciousness = 0.38538089976567685)

Rank 3: (statement 11, suspiciousness = 0.2991065771508642)

Rank 4: (statement 9, suspiciousness = 0.2474228192789846)

Rank 5: (statement 10, suspiciousness = 0.20702606371406404)

Rank 6: (statement 5, suspiciousness = 0.11544558863616436)

Rank 7: (statement 6, suspiciousness = 0.09439673874545454)

Rank 8: (statement 4, suspiciousness = 0.051459717722740925)

Rank 9: (statement 8, suspiciousness = 0.04372378929106277)

Rank 10: (statement 2, suspiciousness = 0.01710602806678727)

Rank 11: (statement 12, suspiciousness = 0.014113023564858775)

Rank 12: (statement 3, suspiciousness = 0.014058507432752011)

* **Bug version 3:**

Buggy statement = 9

Rank 1: (statement 9, suspiciousness = 0.4234073739726831)

Rank 2: (statement 1, suspiciousness = 0.0929495186349149)

Rank 3: (statement 5, suspiciousness = 0.061999300449992474)

Rank 4: (statement 6, suspiciousness = 0.05876827839429137)

Rank 5: (statement 8, suspiciousness = 0.056855056604463695)

Rank 6: (statement 7, suspiciousness = 0.04245275156380434)

Rank 7: (statement 11, suspiciousness = 0.027308267453531706)

Rank 8: (statement 4, suspiciousness = 0.017441189495774913)

Rank 9: (statement 3, suspiciousness = 0.014252535326457247)

Rank 10: (statement 12, suspiciousness = 0.012899563900154249)

Rank 11: (statement 2, suspiciousness = 0.012314725419503169)

Rank 12: (statement 10, suspiciousness = 0.012011311917325513)

* **Bug version 4:**

Buggy statement = 11

Rank 1: (statement 11, suspiciousness = 0.951589578733685)

Rank 2: (statement 1, suspiciousness = 0.5711516181280396)

Rank 3: (statement 7, suspiciousness = 0.37186392835806725)

Rank 4: (statement 5, suspiciousness = 0.1633646103385627)

Rank 5: (statement 10, suspiciousness = 0.1164017986922257)

Rank 6: (statement 9, suspiciousness = 0.1116094911887344)

Rank 7: (statement 6, suspiciousness = 0.08812692237456406)

Rank 8: (statement 4, suspiciousness = 0.06333491158290411)

Rank 9: (statement 8, suspiciousness = 0.028992023970928836)

Rank 10: (statement 12, suspiciousness = 0.01960886284622214)

Rank 11: (statement 2, suspiciousness = 0.015534058608757654)

Rank 12: (statement 3, suspiciousness = 0.013888089751949736)

**Buggy program has two bugs:**

* **Bug version 1:**

Buggy statement = 5, 7

Rank 1: (statement 7, suspiciousness = 0.978271386988596)

Rank 2: (statement 5, suspiciousness = 0.9582726715432475)

Rank 3: (statement 1, suspiciousness = 0.5604011862441373)

Rank 4: (statement 11, suspiciousness = 0.40121825453778925)

Rank 5: (statement 4, suspiciousness = 0.27321901961606443)

Rank 6: (statement 9, suspiciousness = 0.08778170813304857)

Rank 7: (statement 8, suspiciousness = 0.056376029108234645)

Rank 8: (statement 10, suspiciousness = 0.05397713779170679)

Rank 9: (statement 2, suspiciousness = 0.02481634124926121)

Rank 10: (statement 6, suspiciousness = 0.021607059607084544)

Rank 11: (statement 3, suspiciousness = 0.0193469406806406)

Rank 12: (statement 12, suspiciousness = 0.013969339607139293)

* **Bug version 2:**

Buggy statement = 5, 9

Rank 1: (statement 5, suspiciousness = 0.9310082589384204)

Rank 2: (statement 9, suspiciousness = 0.930173071990186)

Rank 3: (statement 1, suspiciousness = 0.31695707970921594)

Rank 4: (statement 11, suspiciousness = 0.06657710434308282)

Rank 5: (statement 4, suspiciousness = 0.06441288426772274)

Rank 6: (statement 7, suspiciousness = 0.06220460862919175)

Rank 7: (statement 8, suspiciousness = 0.05905531069026734)

Rank 8: (statement 2, suspiciousness = 0.02002874824001105)

Rank 9: (statement 12, suspiciousness = 0.018372471546093932)

Rank 10: (statement 3, suspiciousness = 0.017647617943963217)

Rank 11: (statement 6, suspiciousness = 0.013323863426512235)

Rank 12: (statement 10, suspiciousness = 0.013251847621063616)

* **Bug version 3:**

Buggy statement = 5, 11

Rank 1: (statement 11, suspiciousness = 0.98729820756105)

Rank 2: (statement 5, suspiciousness = 0.9667753418143543)

Rank 3: (statement 1, suspiciousness = 0.24129673785271133)

Rank 4: (statement 4, suspiciousness = 0.22738419534572535)

Rank 5: (statement 10, suspiciousness = 0.155726899367223)

Rank 6: (statement 7, suspiciousness = 0.09697844289825296)

Rank 7: (statement 9, suspiciousness = 0.06081894032919881)

Rank 8: (statement 8, suspiciousness = 0.02128214781202245)

Rank 9: (statement 3, suspiciousness = 0.017935534540620572)

Rank 10: (statement 12, suspiciousness = 0.017579475588958934)

Rank 11: (statement 6, suspiciousness = 0.01676146019626115)

Rank 12: (statement 2, suspiciousness = 0.0162447284386604)

* **Bug version 4:**

Buggy statement = 7, 9

Rank 1: (statement 7, suspiciousness = 0.9862181152288294)

Rank 2: (statement 9, suspiciousness = 0.9561940882548502)

Rank 3: (statement 1, suspiciousness = 0.5437230204680951)

Rank 4: (statement 6, suspiciousness = 0.16757652212537458)

Rank 5: (statement 8, suspiciousness = 0.11531198290030358)

Rank 6: (statement 11, suspiciousness = 0.07304920273881635)

Rank 7: (statement 5, suspiciousness = 0.061458249522059846)

Rank 8: (statement 3, suspiciousness = 0.024748697700653712)

Rank 9: (statement 10, suspiciousness = 0.01838445587633763)

Rank 10: (statement 4, suspiciousness = 0.0182886682514939)

Rank 11: (statement 2, suspiciousness = 0.017449873575667855)

Rank 12: (statement 12, suspiciousness = 0.01680818013383534)

* **Bug version 5:**

Buggy statement = 7, 11

Rank 1: (statement 11, suspiciousness = 0.9796917878713722)

Rank 2: (statement 7, suspiciousness = 0.9795107301759004)

Rank 3: (statement 1, suspiciousness = 0.49147736754354443)

Rank 4: (statement 10, suspiciousness = 0.3120091040142002)

Rank 5: (statement 6, suspiciousness = 0.30330575533007154)

Rank 6: (statement 5, suspiciousness = 0.12764973676691976)

Rank 7: (statement 9, suspiciousness = 0.11937245026109462)

Rank 8: (statement 4, suspiciousness = 0.05424113792415262)

Rank 9: (statement 8, suspiciousness = 0.046385996301951914)

Rank 10: (statement 12, suspiciousness = 0.017012146535306274)

Rank 11: (statement 3, suspiciousness = 0.014385678060759254)

Rank 12: (statement 2, suspiciousness = 0.013427650436587764)

* **Bug version 6:**

Buggy statement = 9, 11

Rank 1: (statement 11, suspiciousness = 0.489047232701984)

Rank 2: (statement 9, suspiciousness = 0.43729286499401204)

Rank 3: (statement 1, suspiciousness = 0.11697756047206415)

Rank 4: (statement 7, suspiciousness = 0.043192812682411)

Rank 5: (statement 8, suspiciousness = 0.03877280156928867)

Rank 6: (statement 5, suspiciousness = 0.024247482519095375)

Rank 7: (statement 6, suspiciousness = 0.019950709958579293)

Rank 8: (statement 4, suspiciousness = 0.015971576806207647)

Rank 9: (statement 3, suspiciousness = 0.013917421487038471)

Rank 10: (statement 12, suspiciousness = 0.012389518836393729)

Rank 11: (statement 2, suspiciousness = 0.01112234439815872)

Rank 12: (statement 10, suspiciousness = 0.010002374318880155)

**Buggy program has three bugs:**

* **Bug version 1:**

Buggy statement = 5, 7, 9

Rank 1: (statement 7, suspiciousness = 0.9687148055777279)

Rank 2: (statement 5, suspiciousness = 0.9539424984459381)

Rank 3: (statement 9, suspiciousness = 0.9499621358281095)

Rank 4: (statement 1, suspiciousness = 0.3036297175156942)

Rank 5: (statement 8, suspiciousness = 0.08401828416400886)

Rank 6: (statement 4, suspiciousness = 0.05775165950438313)

Rank 7: (statement 11, suspiciousness = 0.03854111406967128)

Rank 8: (statement 2, suspiciousness = 0.022128144296607165)

Rank 9: (statement 3, suspiciousness = 0.01851789619011677)

Rank 10: (statement 6, suspiciousness = 0.015930312166554394)

Rank 11: (statement 12, suspiciousness = 0.015253688176822171)

Rank 12: (statement 10, suspiciousness = 0.014398748525637724)

* **Bug version 2:**

Buggy statement = 5, 9, 11

Rank 1: (statement 11, suspiciousness = 0.9863760427707534)

Rank 2: (statement 5, suspiciousness = 0.9813362636063252)

Rank 3: (statement 9, suspiciousness = 0.9643160175077321)

Rank 4: (statement 1, suspiciousness = 0.44154859987386286)

Rank 5: (statement 7, suspiciousness = 0.21629717013631344)

Rank 6: (statement 8, suspiciousness = 0.18998507611720122)

Rank 7: (statement 4, suspiciousness = 0.10915303105904697)

Rank 8: (statement 10, suspiciousness = 0.026437757920514154)

Rank 9: (statement 12, suspiciousness = 0.02052890520813029)

Rank 10: (statement 3, suspiciousness = 0.018602752559725922)

Rank 11: (statement 2, suspiciousness = 0.01691813396110234)

Rank 12: (statement 6, suspiciousness = 0.01642124046740276)

* **Bug version 3:**

Buggy statement = 7, 9, 11

Rank 1: (statement 11, suspiciousness = 0.983113036681985)

Rank 2: (statement 7, suspiciousness = 0.9713290565544477)

Rank 3: (statement 9, suspiciousness = 0.9594233843675704)

Rank 4: (statement 8, suspiciousness = 0.41455009395981945)

Rank 5: (statement 1, suspiciousness = 0.38150288985043457)

Rank 6: (statement 6, suspiciousness = 0.1467904825849981)

Rank 7: (statement 5, suspiciousness = 0.06123748711021323)

Rank 8: (statement 4, suspiciousness = 0.03272296779399646)

Rank 9: (statement 12, suspiciousness = 0.01916354923987563)

Rank 10: (statement 10, suspiciousness = 0.016683050682098802)

Rank 11: (statement 2, suspiciousness = 0.016291452735227623)

Rank 12: (statement 3, suspiciousness = 0.015737908506928786)

* **Bug version 4:**

Buggy statement = 5, 7, 11

Rank 1: (statement 7, suspiciousness = 0.9777712371038485)

Rank 2: (statement 11, suspiciousness = 0.9776573045943997)

Rank 3: (statement 5, suspiciousness = 0.9584807363222956)

Rank 4: (statement 1, suspiciousness = 0.44209841446216736)

Rank 5: (statement 4, suspiciousness = 0.17006331827849255)

Rank 6: (statement 10, suspiciousness = 0.15789029438097985)

Rank 7: (statement 9, suspiciousness = 0.05943757922831084)

Rank 8: (statement 2, suspiciousness = 0.023792997063237894)

Rank 9: (statement 8, suspiciousness = 0.023279756587320222)

Rank 10: (statement 6, suspiciousness = 0.017759266149782647)

Rank 11: (statement 12, suspiciousness = 0.015914472806599297)

Rank 12: (statement 3, suspiciousness = 0.013682256302010162)

**Buggy program has four bugs:**

* **Bug version 1:**

Buggy statement = 5, 7, 9, 11

Rank 1: (statement 11, suspiciousness = 0.9895772989381099)

Rank 2: (statement 7, suspiciousness = 0.9893329521110898)

Rank 3: (statement 9, suspiciousness = 0.975161648205311)

Rank 4: (statement 5, suspiciousness = 0.9688940457594188)

Rank 5: (statement 1, suspiciousness = 0.48962418715062217)

Rank 6: (statement 4, suspiciousness = 0.13400924530358324)

Rank 7: (statement 8, suspiciousness = 0.0650532433824288)

Rank 8: (statement 2, suspiciousness = 0.02036391283619951)

Rank 9: (statement 3, suspiciousness = 0.01967720829225469)

Rank 10: (statement 12, suspiciousness = 0.01709633699735806)

Rank 11: (statement 10, suspiciousness = 0.01665090260331591)

Rank 12: (statement 6, suspiciousness = 0.013929245329650324)