

2019  
—  
2020  
GÜZ



# 2019-2020 Güz Yarıyılı Algoritma Analizi Final Projesi

PELIN AKPINAR - 14011032

**Konu :** Graf Üzerinde Arama İşlemi

**Problem:** Kevin Bacon Sayısının Bulunması

## EKRAN GORUNTULERI

### 1. Kevin Bacon Sayisi Bulma

Örnek 1:

Taylor, Eugene Alvin, Philip Beer, Harry Angelo Hateley, John Marten, Sarah Smolek, Jeff Townsend, Robert McCarty, Vicki Brown, Olivia Paré, Michael Cheng, Susan Jahan, Marine Walker, Rock A. Van Valkenburgh, Deborah Blackwell, Tamu Alvin, Dave Beard II, William Berlin, Steve Mones, Paul Bazz, John Allen, Lee Moreno, Ric Bateman, William Jordan, Elizabeth Kimbball, Stuart Ryder, John Dupree, Linda Bowman, Pamela Rakhaman, Arkady Merritt, Juanita Lane, Larry Odell Leighton, Roberta Counts, Gerard J. Prince, Dale Schaefer, Craig Veyts, Semyon Buntsis, Yefim Busfield, Timothy Ellis, Bruce E. Mullins, David A. Sykes, William R. Helmus, Joyce D. Harlson, Hershel B. Mont-Eton, Norman Marshall, Glenn Leigh Crawford, J. A. Pagan, Antone Henderson, Leslie Clark, Dawn Hamilton, Lois Areno, Lois Jenesky, George Urbansky, Phillip A. Flynn, Michael Schmidt, Solomon Markowicz, Mark S. Platko, David D. Jones, Glenn-Michael Briggs, Samuel Thomas, Dave Wilke, Robert J. Gottarelli, Gino Gillette, Larry R. Viola, Jeff Rearden, Brad Dogans, Ed Gordon, Philip Powers, Barbara Trujillo, Anthony Bristol, John E. Morris, Leslie Hurtes, Hettie Lynne Erwin, Lee Friedman, Norman Williams, Webster Robbins, Gregory Stone, Wayne Farrington, Hugh Kerner, Bruce M. Pierce, David Mirelez, Tony Richmond, Bill W. Ralston, James Kahn, Al French, John Schepps, Shawn Motta, Bess Frazier, Loree Columbu, Franco Taylor, Rocky Meaney, Nick Olsen, Björn Dunn, Kathleen S. Twigger, Stephen Renee, Juleme Giger, Werner Nepita, Sean M. Forestal, Terry Walsh, Brian Hicks, Andie Anderson, Scott G. Rose, Rochelle Jarvis, Martin Adkins, Seth Garten, Aimee Amanda Ellis, Greg Walcutt, John Hyde, Jonathan Cronnelly, David Ratzin, Lisa Cooke, Gregory Smith, Stephen Wolfe Duffin, Shay Cagnotti, Chris Marino, Mandana Pettersson, Dan Forsyth, Edmund Alan Graham, Richard Capri, Mark Sagalevitch, Dr. Anatoly M. Winslet, Kate Laing, Martin Lancaster, James Hasler, Lorenz Tuohy, Liam Stewart, Ewan Chatton, Charlotte Bates, Bobbie Garten, Jo Lynn Owers, Kevin Brightwell, Paul Ayres, Rosalind Overby Roos, Camilla Hislop, Scott Ling, Van Bates, Kathy Brett, Fannie Lonsdale, Shep Evans-Jones, Jonathan Owens, Alexandria Page, Oliver Palter, Lew Chapman, Mark Lindsay Byrne, Chris Herbert, Paul Ashton, Richard Fari, Thomas James, Emmett Francis, Romeo Szedlik, Bülə Abernathy, Lewis Barry, Jason Fox, Bernard Szedlik, Ferenc Garrett, James Truitt, Mark Rafael Gruffudd, Ioan Fox, Richard Lynch, Don DiCaprio, Leonardo  
Bacon no : 2  
DiCaprio, Leonardo is played with Paxton, Bill in Movie :Titanic (1997)  
Paxton, Bill is played with Bacon, Kevin in Movie :Apollo 13 (1995)  
Menu

1. Bacon number  
2. Distance btw two actors  
3. Exit

Leonardo Dicaprio

Örnek 2:

ve, Karen Cera, Michael Meyer, Jessica Bush, Brantley Johnson, Danny Cavett, Dick Doyle, Shawn Cheng, Barney Brier, Nicole Sali, Richard Hinkle, Marin McAleese, Jim Serpico, Terry Blaisdell, Nesbitt Robin, Tucker Bridges, Jordan Greene, Brian Magner, Colm McCormack, Jack Gowdy, Curt Kingsley, Brigitte Errico, Melissa Emmerich, Noah Aasland, Derek Mitchell, Elizabeth Margiotta, Chuck Fitzgerald, Melissa McAnulty, Frank Campbell, Desmond Baxter, Jennifer Burdon, Catherine Page, Erika Smith, Taran Noah Borden, Chuck Hirano, Kelly Fishman, Michael Griffio, Joseph S. Clarke, Melody Casella, Max Paisen, Rob Hart, Emily Benson, Jodi Schulte, Justin Carroll, Pat Toji, Marcus Brown, Clancy Wright, Samuel E. Ewing, Blak e McIver Clarke, Cam Strong, Tara Kuter, Kay E. Horton, Red Campanella, Joseph Jones, Doug Murphy, Joe Wilson, Don 'The Dragon' Ginther, Mark Kahana, Rick Munchkin, Richard W. Hufsey, Bill Kennedy, George Camacho, Art Kerns, Sandra Roberts, Ted Jan Whipple, Shonda Mitchum, Christopher Forrest, Irene Dixon, Pamela Person, Rex Tripp III, Chester E. Richardson, Mark Tewes, Lauren Budinger, John Iorg, Jason Rabago, Richard Buford McMoyler, Dave Daniels, William McDancer, Buck Hohnbaum, Scott 'Scooter' Beasley, Allyce Kasper, Gary Mitz, Michael Shriner, Wil Napier, Hugo Savidge, Jennifer Deemer, Susan Trowbridge, R. Gern Rector, Jeff White, Sebastian Murdocco, Vince Gibb, Donald Gonneau, Jackie Damas, David Smith, J. Brennan Greer, Emily Albrecht, Patricia Alice Ayers, Curt Havard, Elven Gitomer, Michael Bloom, Eddie Fuentes, Ernie Del Rey, Pilar Griffith, Jack Winslow, Dick Sands, Christopher Richter, Deborah Baker, Kirsten Wilkin, Brad Fiedler, John Kaplan, Marvin Long, Keny Lopez, Sal Fox, Michael J. Adams, Arthur Williams, Bert Clinger, Debra Hemley, Trevor Pettit, Robyn Shelley, Dave Thompson, Betsy Lynn Solomon, Alan Kenney, Joel Gabot, Ceil Schmidt, Georgia Naughton, David Roswell, Maggie Tedrow, Irene Maxwell, Don Thompson, Carol Gwynn Victor, Paula Benedict, Dirk Cooke, Fred Pankin, Stuart Price, Vincent Bass, Emory Kalberg, Dale Stone, Andy Benjamin, Richard Sinutko, Shane Anderson, Adam Gould, Sid Koustik, Art K. Randall, Tony Schwarzenegger, Arnold  
Bacon no : 2  
Schwarzenegger, Arnold is played with Furst, Stephen in Movie :Scavenger Hunt (1979)  
Furst, Stephen is played with Bacon, Kevin in Movie :Animal House (1978)  
Menu

1. Bacon number  
2. Distance btw two actors  
3. Exit  
Schwarzenegger, Arnold  
Enter actor name for bacon search

Arnold Schwarzenegger

### Örnek 3:

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i Robinson, Traci Michaels, Karen Aronson, Steve Rickman, Patrick Duffy, Lawrence Mahon, Michael C. Farley, Teresa Yvon Goldberg, Bill Parks, John Gibson, Laurie Ann Catus, Gary L. Fowler III, Robert H. Jackman, Hope Lewis, Keith Freeman Jr., Al Burr, Cheryl Brooks, Sharon Brooks, Yvette Dacosta, Christian J. Lemelle, Daniel Benton, Vanessa La Marre, Jean Claude Farley, Mike Schultz, Armand Bigelow, LaToyah Pittman, Reggie Montgomery, Reggie Berman, David Robinson, Eartha Ross, Monty Hewitt, Jerry Hodge, Mike Green, Jauquette Poland, Greg Moscaritola, Vincent Davis, Eddie Payne, Eric Jordan, Michael Licciardello, Elmer Cox, Gerica Kelly, David Patrick Reed, Steve Hampton, Dawn Mandela, Nelson Muhammad, Zaahir Lauper, Marcus Ruge, George Marshall MacKay, Lizbeth Chandler, Damon Kelleher, Tim Odom, George T. Quiles, Ian Kelly, Brendan Brazel, Gerald Elkins, Debra Guidall, George Hyman, Fracaswell Broadnax, Dwayne Cook Owens, Richard Kuntler, William Cooper Sr., Ralph Francois, Ryan Blackshear, Aaron Sharpton, Al Richard, Judine Hawkins Jackson, Tamaraleah Imperioli, Michael Sinoval, Maxwell Robinson, Michelle Purviance, Douglas Folkes-LeMelle, Neisha Anagnos, Bill Monson, Lex James, Stephen Little Thomas, Iris Charbonneau, Jay Guyton Jr., Cleave Parker, Leonard Lindo, Delroy Rushing, Larry Seale, Bobby Elejaide, John McCoy, Larry Ralph, Michael King, Wendy Means, Randy Peck, Jonathan Reidy, John Pemberton, Lenore Rubin, Christopher Graham, Dion Mantz, Delphine T. Gross, Mark Barnwell, Nicholas Truro, Victor Linn-Baker, Mark Rasche, David Bradley, Bill Hanft, Helen Hemingway, Mariel Vance, Kenny Allen, Woody Keaton, Diane Byrne, Anne Sheller, Damion Doumanian, John Abzug, Bella Ludwig, Karen O'Donoghue, Michael Farrow, Tisa Conroy, Frances Weis, Gary Brown, Katelyn C. Barr, Steve Mayo, Billy Payne, Allen Lee, James McNamara, Kevin Poudrier, Todd Marino, Nick Shonka, J. Scott Borgman, Janet Wright, Janet Junger, Sebastian Martin, Brad Kimsey, Todd Slavin, Anya Duff, Elizabeth Kennedy, Merle Parham, Ken Hartman, Troy Ward, Sandy Mastrantonio, Mary Elizabeth Stinson, Patrick Schneider, Miles Wahlberg, Mark Argenbright, Jim Spasse, Michael Rutstein, Barry Samuels, Melissa Anzur, Terry Trotman, Tim Francis, Alan Palermo, Chris Hawkes, John Malone, Lloyd Clooney, George Melberg, Christopher Mahler, Bruce Schwimmer, Rusty Hopkins, Josh Shah, Kiran Caldinez, Sonny Harris, George Richards, Terry Marshall, Frank Chinn, Anthony Frederick, Christopher Ford, Harrison Bacon no : 2
Ford, Harrison is played with Allen, Karen in Movie :Raiders of the Lost Ark (1981)
Allen, Karen is played with Bacon, Kevin in Movie :Animal House (1978)
Menu
1. Bacon number
2. Distance btw two actors
3. Exit
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Harrison Ford

### Örnek 4:

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ichardson, Beau Donnelley, Alex Strassman, Marcia Neufield, Glenn Pierce, Robert Lasic, Franco Roman, Paul Reid Lichtman, Paul Daly, Tyne Carr, Caroline Bryce, Colette Stewart, Bryon Cipriani, Michael Guciullo, Tyler Austin, Alana Merritt, Lynda Daydoge, Billy Bachar, Carmit Dietz, Donavon Allen, Chad E. Levin, Abbe Johnson, Tony T. Thomas, Farrell O'Neill, Ryan Klebahn, Audrey Shenefiel, Kelly Dean, James F. Ford, Faith Kaplan, Joshua Roos, Stefanie Honda, Carol Harkness, James Towers, Henri Coppola, Mark Yermazyan, Rafale Sperberg, Fritz Arkin, Matthew Lacause, Sebastian Loveheart, C.C. Cornell, Joran Nichols, Nancy Jacobson, Jordan Rosatti, Greg Heine, Brett Anthony, Bryan Janklowicz, Gil Martineck, Sarah Bergman, Teddy Grimaldi, Dan Hartman, Brynn Hesser, Donovan Keith Group, Mitchell Horn, Matthew Panton, Jenifer Meismer, Mark Rachins, Alan Childers, Christopher D. Shroder, D.L. Smollett, Jussie Harley, Pamela Larson, Eva Topper, Kimberly Di Stefano, Morgan Rose, Sherrie Nickson-Soul, Julia Robie, Wendy Silver, Robert Wright, David Lee, Nick Brandy, J.C. James, Milton Michaud, Michael Boyd, Philip Van Horn, Sara Bittle, Ryan James O'Quinn, Carrick Fording, Ken Carlson, Krissy Bennik, Greg Wilcox, Cathy Wilhelms, Michael Rogness, Erin Raynesford, Richard Good, Melanie Coleman, Patricia Belden, Rosemarie Zall, Rose E. Betz Takahashi, Joanne Abrams, Robert Boylan, Gari Lienhof, Karl Plaskett, Dave Solms, Fredrich Kozub, Brigitte Tenant, Chris Bukey, David Lucchetti, Gino Stavast, Stephen Frank, Diane Kennedy, Steve Herron, Royce Neuman, Gil Mann, Wesley Curtis, Jed Boritzer, Etan Hofer, Manfred Tester, Hans Shea, Christopher Smith, Norman Koreski, Jacinta Hartley, Clabe Mitchell, Russell Box, Brian Oleson, Karen Garfield, Jason Bogg, Dana Stavin, Mary Blake, Daniel Wiff, BW Charles, Zachary Wiff, B.W. Erickson, Dean Boylan, Chris Jones, Nathan Tung, Bill Lai, Rocky Vinnichenko, Leeza Lam, Doris Guleen, Igro Ruskin, Ian White, Diane Scripnik, Rusean Gates, Damien Mak, Shirley Ustichenko, Alexander Dunbar, Mary Ellen Wilkinson, Gary Grishayeva, Nonna Langmead, John Holmes, Poosy Lo, Ken Arthur, Brett Nichols, Jonathan Hicks, Mark Yeryomina, Larisa Montgomery, Randall Morris, Steve Markaryan, Misha Hoeren, Brenton Hsin, Jim Pape, Paul Kazmarek, Kristopher Ren, Esmond Lorge, Dan Ching, Chan Man Liu, Jackson Dickson, Neil To, Chan Wai Sit, Ailen Jones, Steve Formica, Sofie Eaves, John Kininmonth, Mathew Walker Sheih, Wella Petrov, Yuri French, Mark Chan, Jackie Bacon no : 2
Chan, Jackie is played with Hules, Endre in Movie :Jing cha gu shi IV: Jian dan ren wu (1996)
Hules, Endre is played with Bacon, Kevin in Movie :Apollo 13 (1995)
Menu
1. Bacon number
2. Distance btw two actors
3. Exit
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Jackie Chan

### Örnek 5:

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Richard Cooney, Kevin Gibson, William Feuerstein, Mark Amidou Bozeman, Terry Wickliffe, Mary Wood, Jody Knickerbocker, Thomas Ufland, Chris Assimi, Aziz Mohamed, Attifi Hays, David Lewis Barry, Thom Gagnon, Steven M. Maynard, Brian Dye, Dale Boensch, Jim West, Jason C. Stokey, Mike Abounoum, Ahmed Graf, David Coleman, Baan Bachmann, Conrad Liddy, G. Gordon Pearce, Guy Mohamed, Zouhair Bedmiston, Mike Gerald, Mike Farnsworth, Freddie Joe Ramsey, Stephen Johnson, Bonnie Pentz Jr., Robert Fitzgerald, Dennis Tran, Peter Underwood, Blair Kortobi, Jihane Bruyere, Baouyen C. Larsen, Lawrence Noel Barnett, John Tran, Tuan Clapp, Gordon Manning, Helen Galle, Jay Whiten, Richard Taylor, Elayn Nubia White, Matt Ewell, Keith Jackson Jr., Gerald Fulton, Stephen Whigham, Shea Gardner, Drew Searcy, Nick Gaston, Haven Brooks, Susan Schafer, Ronnie Davis, Matthew McGruther, Michael Brumfield, Rhynell Lewis, Shamari Guiry, Tom Floyd, Roger Huvane, Chris Northcutt, Dane McKee, Christy Bouvouras, Angus Richardson, Russell Arnold, Karolyn Ash, Arian Waring Gerald, Matt LeNoble, Shawn Lessick Jr., James Brown Jr., Neil Hepner, Jeff Martin, Daniel Hill, Jonathan Newman, Jack Mullins, Geoff Kittles, Tory Macaulay, Marc Shannon, Michael Farrell, Colin Benatar, Dennis T. Gant, Kurt Hauser, Cole Edmiston, Michael Taylor, Frances Polson, John Rhames, Ving Manon, Christian Vargas, Antonio Wilkinson, Matt Morris, Lester Luxton, Dan Chan, Kee Lovell, Alan Gleeson, Brendan Rodriguez, Adriana Partridge, Candice McMillan, Karl Mapother, William Cruise, Tom Partridge, Brett Rogic, Nada Bell, Nicholas Newton, Thandie Ons, Kelly Roxburgh, Richard Purcell, Dominic Brogers, Cristina Morris, Billy Papademetriou, Nicholas Mussett, Tory Fleming, Kim Rodriguez, Sandra Roberts, Daniel Reis, Natalie Ade Farnell, John Cunningham, James Cao, Jason Ninh Legeno, David Goldie Julian, Chuck O'Boyle, Paul Douglas, Sam Ford, Alan Cantwell, Mickey Taheny, Michael Ritchie, Guy Fogerty, Adam Hoare, Sid Taheny, John Buckham, Jason Shield, Andrew Sedin, Sydney Meyers, Eric Graham, Stephen Steedman, Trevor Faraday, Tim Gee, Robbie Welch, Scott Bremner, Ewen Fleming, Jason Statham, Jason Roussounis, Jimmy Hathaway, John Williams, Joe Donagh, Liam Beckwith, Andy Beck, William Reid, Mike Topic, Veilbir Crouch, Trevor Smith, Dean Hughes, Michael Pitt, Brad

Graph Level(Bacon no) : 3
Pitt, Brad is played with Serbedzija, Rade in Movie :Snatch. (2000)
Serbedzija, Rade is played with Devane, William in Movie :Space Cowboys (2000)
Devane, William is played with Bacon, Kevin in Movie :Hollow Man (2000)
Menu

1. Bacon number
2. Distance btw two actors
3. Exit
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Brad Pitt

### Örnek 6:

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inott, Barbara Dillon, Andrea Russ, Cindy Petersen, Robert Forman, Joey Guss, Louie Gularoff, Sydney Logothetis, Dimitri McGinnis, Kathi Castle, Gene McMillan, Bill Lucoff, Bruce L. McCleskey, Wally Middlebrooks, Wilfred R. Stevens, Nico Arnold, Clint Winkler, Adam David Auld, Georgie Lindsay, Mary Kuby, Bernie Hunt, Susan Kay Clinton, Jack R. Cutler, Jon Michaels, Brock Abbott, Diahnné Smith, Roosevelt Porter, Jake Vernon Sivera, Frank Murry, Bill Phillips Rucker, Washington Reed, Booty Jenkins, Taryn Summers, Leslie Dell'Acqua, Ottaviano Danese, Shera Pierce, Nat Kert, Larry Prince, Ronald Prince, Steven Ross, Harold Tole, William Gaines, Lenny Escobosa, Manuel Salerno, Jay Flynn, Frederick Schell, Paul Michael Gillespie, Ann Watson, Onita Robin, Janet Darling, Gregory Sims, Orlando Paul, Don Michael Duckworth, Carol Haas, Robert Herman, Rick Massey, Janis Griffith, Eddy Bardot, Danni Fox, Mara Carter, Steven 'Lance' Bell, Demesa Tomlin, Melanie Ryland, Alex Cheung, Daphne Trudeau, Paul Shapiro, Jason McFadden, Bob Cloege, Erik Berg, Ingrid Galloway, Linda Pope, Greg Seeley, Kristine Knauer, Leslie Harrington, Lee Lassiter, Alicia Murphy, Gayl Riccardi, Mark Dixon, Willie Flaherty, Maureen Bolles, Don Jacoby, Gary Lang, Alexis West, Linda Davis, Lorrie McGuire, Annie Condos, Dimo Speiser, Frank Buffalo, Norton Harris, Ted McCarthy, Charlie Gottfried, Cyndi Ellis, Butch Roth, Joyce St. Laurent, Michael Cawlfield, Constance Frazier, L.D. Sacha, Claude Sylvester Erdman, Dennis Boyd, Kelly Latimer, Cherie Starrett, Jack Duthie, John McClinton, Jon Dowd, Nancy Shorts, Barbara L. Belisle, Danny Barrette, Yvon Carlson, Jeff Docken, Ronald L. Odegaard, Myron Head, Gracie Madigan, Connie Warren, Jennifer Tenesi, Guido Hanson, David Tetreault, Jean Rosario Roberge, Dick Ball, Blake Poitier, Anika Jones, Vinnie Rader-Duval, Dean Grimes, Camryn Christopher, Jason Pessin, Jonathan Storms, Tim Eimers, Brenda Box, Joey Hee, Dana Veillon, Astrid Lally, Craig Woods, Shawn Black, Marina Arias, Michael Pagan, Angelo Kletter, Kerry de Matteo, Drea Martin, Rudolf Householder, Richard Wulff, Ryan McClennon, Rusty Soper, Mark Sokolova, Natalia Entin, Debbie Fraser, Jonathan Marko, Larry Strahan, Ruth P. Moreno, Servio T. Triscari, Filomena McGuinness, Carola Lewis, Diane Choy, Tomas Zimmer, Kim Hallowell, Lynn Lucchesi, Deborah Velasco, Ramiro Thom, Ruth Lee, Bruce A. Saunders, Lanna De Ville, Willy Walker, Randy Powers, Matthew Ledon, Horatio Williams, Michael

Bacon no : 2
Williams, Michael is played with Rourke, Mickey in Movie :Bullet (1996)
Rourke, Mickey is played with Bacon, Kevin in Movie :Diner (1982)
Menu

1. Bacon number
2. Distance btw two actors
3. Exit
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Michael Williams

### Örnek 7:

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Menu
1. Bacon number
2. Distance btw two actors
3. Exit
1
Enter actor name for bacon search
Hanks, Tom
Actor found
Actor found
Bacon, Kevin Okumu, Fredrick Omondi Menyuk, Eric Leboyare, Douglas Ntshona, Winston Oketch, Daniel Otieno Kigadi, Peter Brereton, Wendell Kunene, Vusi Maina, Charles Gitonga Gibbs, Keith Lewarani, Jomo Mtimkulu, Zolile Iraya, Benjamin Matio ga, Frans Matome Miguel, Nigel Tjatji, Bright Lesley, John Chiume, Connie Odhiambro, George Owino Rateng, Benson Ojoo, Da nstan Patrick, Dennis Orina, Dennis Vazquez, Yolanda Mwanazi, Jackson P. Aluanga, Morris McCann, Sean Khubeke, Peter Ma shiane, Solomon Owiti, Miriam Matshikiza, John Maake, Salathial Sidumo, Fanyana H. Letsoalo, Lincoln M. Abraham, Falcone r Sithole, Mabutho 'Kid' Omole, Robert Otieno Mutombo, Ilo Murandah, Stanley Makhene, Ramolao Mbugua, Gibson Gathu Gamp u, Ken Mutei, Francis Matheson, Tim Greenlough, Rick Farmer, Reginald Jurgenson, Aseneth Grooman, Stacy Elliott, Robert Freeman, John Jessie, DeWayne Bloom, Verna McGill, Bruce Johnson, Sunny Eby, Rick Danova, Cesare Sutherland, Donald McCa rtin, Sean Kenney, Douglas Allen, Karen Widdoes, James Hulce, Tom Furst, Stephen Daniel, Joshua Belushi, John Jacklin, Judy Metcalf, Mark Vick, Helen Lauris, Priscilla Vernon, John Baur, Lisa Dumas, Jebidiah R. Robinson, Raymone Simonds, Fr ed Holcomb, Sarah Riepert, Peter Cray, Robert Denning, Katherine Smith, Martha Miller, Chris Weller, Mary Louise Daughto n, James Bonnheim, Bruce Bishop, Stephen Roberts, Eliza Hanks, Tom
Bacon no : 1
Hanks, Tom is played with Bacon, Kevin in Movie :Apollo 13 (1995)
Menu
1. Bacon number
2. Distance btw two actors
3. Exit
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Tom Hanks

### Örnek 8:

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Nley Charleson, Ian Halmer, G^nther Maria Mills, John Raj, Tilak Padamsee, Alyque Razdan, Virendra Godley, Michael Norma n, Gerard Shende, Sunil Horsfall, Bernard Sarup, Jyoti Gupta, Alpna Gupta, Neena Gupta, Rahul Gielgud, John Sibley, Davi d Singh, Dilsher Singh, Karkirat Swaroop, Vivek Singh, Gurcharan Mishra, Sudhanshu Chaturvedi, Raj Hill, Bernard Frazer, Rupert Razdan, Roop Kumar Babenia, Bob Tanvir, Habib Clements, John Griffiths, Richard Vernon, Richard Seth, Roshan Jos hi, Bani Sharad James, Geraldine Cossins, James Hordern, Michael Pitale, Manohar Chater, Geoffrey Agashe, Mohan Dubey, S ankarp Kapoor, Gulshan Seed, Graham Myerson, Jane Hutchinson, Caroline Hepton, Bernard Bryant, Michael Chokshi, Charu Ba la Puri, Amrish Sagger, Anthony Apte, Vinay Ratzberger, John Dogra, Avinash Raina, K.K. George, Wilson Hawthorne, Nige l Snell, James Cartwright, Peter Hardiman, Terrence Prakash, Nigam Chatterjee, Shekhar Prakash, Bhatawadekar Sheen, Mart in Lagoo, Shreeram Patankar, Prabhakar Howard, Trevor Drinkel, Keith Oulton, Brian Palsikar, Nana Sethi, Sudarshan Farre ll, Colin Fugard, Athol Singh, Vagish Kumar Makan, Moti Gant, David Harlowe, Peter Alter, Tom Puri, Om Kapoor, Pankaj Ja ffrey, Saeed Daruvala, Homi Hattangadi, Rohini Kashyap, Vijay Krishna, Vijay Sim, Gerald Pradhan, Sunila Dalavi, Sudheer Agha, Jalal Vine, John Savident, John Clark, Ernest Desai, Pratap Chancer, Norman Desai, Anang Kristofferson, Kris Stark, Kimberleigh Comyn, Charles Mork, Alison Bibost, Yves Steyn, Jennifer Reineke, Dick Tate, Lahmard J. Grubane, Thulan Jensen, Todd Phillips, Nicholas Egelhof, Kurt Warde, Joanne Haverly, Laurelle Berenson, Marisa Sherwood, David Corvin, Stephen Bryan, Kenneth Jensen Fridjohn, Anthony Korot, Alla Kristofferson, Tracy Dorch, Kevin Cozzens, Mimi Graham, Gerri t Ashby, Nick Boles, Eric Brunner, Michael Clarke, Graham Van Heerden, Marcel Meek, Jeffrey Barreto, Raymond Van Niekerk , Gert Ngwenya, Liz Cobbold, Clare O'Shaughnessy, Brian Anholt, Christien Shumba, Simon Edwards, Faith Khabo, David Williams, Hywell Fogerty, Adam Jordan, Edward Mangwarara, Winston Leih, Stan Roberts, Ian Reed, Robert Thomas Turner, John I vy, Nigel Kubeka, Nomadlozi Cartwright, Jon Deary, Brendan Moyo, Banele Dala Sibanda, Rosemary Chikobwe Bulloch, Robbie Craig, Daniel Mnisi, Jeremiah Coleman, Marcia Walker, Dominic Dinah, Pesedena Campbell, Rod Russell, Clive Freeman, Morgan
Bacon no : 2
Freeman, Morgan is played with Ntshona, Winston in Movie :Power of One, The (1992)
Ntshona, Winston is played with Bacon, Kevin in Movie :Air Up There, The (1994)
Menu
1. Bacon number
2. Distance btw two actors
3. Exit
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Morgan Freeman

### Örnek 9:

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sie Wilde, Jonathan Terry, Richard C. Alvarez, John Michael Nero, Toni Wagner, Danny Best, Jonathan Rogers, Dan Kincaid, Aron Peterson, Jacob Dierkop, Charles Ballard, Kristi Buxton, Alex Wilson, Robert Brian Styvesant, Amy Borgenicht, Nancy Clark, Richard D. Luke, Jayne Montoya, Angela Cameron, Molly Best, Melissa Styvesant, Sarah Forster, Joan Nagel, Betty Shanks, Donald Stafford, Barbara Lu, Sabrina Wright, Katie Warner, Bree Michael Holland, Dexter Delonge, Thomas Alba, Jessica Maslin, Molly Milas, Darko Garrison, Scott D'Avirro, Nic Saban, Damir Zoricic, Zvonimir Stewart, Daniel Berglas, Ron Abineri, John Veselko, Borut Leadbitter, Bill Jackson, Janna Ujevic, Mate Vnuk, Gordana Miya, Helen Menicanin, Branislav Matula, Vili Gorsic, Niko Benedict, Jay Roposa, Jozef Turk, Matjaz Marlow, Lorrie Sportelli, Andreas Zidaric, Ranko Ovce, Marty Lacey Wallace, Roy Allen, Kirtus Stephens, Alex Stuthman, Fred Norman, Paul Marshall, Ron Baier, Richmond Welles, Jennifer Fleischman, Robert Paxton, Tony Linhart, Buzzy Fore, Hal Harrice, Lincoln Medlin, Victoria Sarasohn, Lane Blaxill, Peter William Helfend, Dennis Glicken, Laura Nazareth, Christine Kemml, Bill Zens, Jennifer Mendum, Mary Shapiro, Ken Petrie, Leo Harris, Berkeley Marciano, Maurice Ruscio, Al Wettig, Patricia Callan, Cecile Bennett, Joe Scott, Joan Horn, John Zimmerman, Natalie Edwards, Luke Reeves, Dianne E. Dawson, Roxann Dilley, Ivor Leslie Rauvier, Claude Dinsdale, Ben Chimento, Robert Cilic, Nicholas Carrico, Monica Ames, Jonathan Arsenault, Martin Tubb, Barry Carey, Cindy Smith, Craig Zimmerman, Matt Hennessey, Paul Ferret, Eve Bloomfield, John Rosenblat, Barbara Drake, Francis Bruce, Colin Carter, Jim Mothle, Ernest Okai, Zorak Swinson, Howard Kershaw, Brian Griffin, Julian Pringle, Bryan Turrell, Robert Munckie, Christopher Ward, Justin Osborn, Sally Morgan, Don Way, Ann Kenton, Will Ross, Jo Browne, Andrea Ross, Andy Ashton-G riffiths, Roger Deniz, Claire Wiley, Edward Haley, Alastair Jean-Charles, Marie Jean-Charles, Patrice Kamarr Standig, Paul Gardner, Herb Jean-Charles, Danielle Jawdokimov, Alexei Adjani, Isabelle Gordon, Bruce Sawalha, Nadim Weston, Jack Hogg, Ian Nedari, Eddy Kroll, Abe Kroll, Hannah Ben Driss, Aziz Freudenheim, John Girolami, Robert V. Cutler, J.C. Khan, Sumar Morgan, Jon Paul Trumppour, John Hageb, Fijad Abramson, Stuart Brauss, Arthur Garfield, Julie Bouhaddane, Larbi Bilginer, Haluk

Bacon no : 2
Bilginer, Haluk is played with Bailey, Bill in Movie :Ishtar (1987)
Bailey, Bill is played with Bacon, Kevin in Movie :Balto (1995)
Menu

1. Bacon number
2. Distance btw two actors
3. Exit
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Haluk Bilginer

### Örnek 10:

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Justin Brimage, Jewel Bond, Sudie Velez, Didi Wardwell, John Imperato, Carlo Strathairn, David Abbott, Joseph Milgram, Lynn Bernardi, Fay Scooter, Zvee Bank, Yudie Esposito, Giancarlo Wexo, Alex DeLorenzo, Michael Lowe, Lawrence Guest, Christopher Nauftts, Geoffrey Craven, Matt Marshall, James Munroe, Jan Caesar, Harry Whittington, Gene Wyle, Noah Sorkin, Aaron Sutherland, Kiefer Jackson, John M. Cruise, Tom Pollak, Kevin Thor, Cameron Winchester, Maud Ostrow, Ron Nicholson, Jack Bodison, Wolfgang Malina, Joshua Gooding Jr., Cuba Jordan, Oscar Saks, Matthew Preston, J.A. Moore, Demi Bowe, David Fink, John Vraa, Sanna Stewart, Megan Duda, John Latinopoulos, Dede Milmeister, Jared Mouton, Benjamin Thomas, Tressa Kurlander, Tom O'Connell, Elinore B'tiste, Iilana Belcher, Patricia Johnson, Cage S. Ohama, Natsuko Delgado, Miguel M. Williams, Afram Bill Gleeson, Patrick Gonzalez, Gonzo Oliu, Ingrid Fernández, Evelina Levi, Nili Moran, Nancy Ortlieb, Jim Bassham, Cynthia Warner, Julie James, Anne Frank, Marilyn Dodds French, Susan Platt, Oliver Thompson Duda, Deborah Ni black, Nicole LeRoy, Zoanne Rudoy, Joshua Egan, Aeryk Davis, Hope McKee, Michelle Paton, Angela Baldwin, William Grant, Beth Reed, Kesha Hanis, Raymond Martin, John Benjamin Margolis, Ilona Torchio, Deborah Scott, Kimberly Tucek, Sarabeth Odums, Lynda Roberts, Julia Goomas, Deborah Dodds, K.K. Ulmer, Terri Gay Gregory, Mary Ethel Youngs, Jim Geter, Leo McGinn, Russ Broadhead, Mimi Marta, Lynne Telmont, Michael Da Silva, Monica M. Bernard, Jay Haufrect, Alan Dirkson, Douglas Trevino, Carmen Gorcey, Elizabeth Singer, Lori Pack, Eugene Wiest, Dianne Kemp, Ken Dalton, Sam Parker, Sarah Jessica Broadhead, Meghan Penn, Chris Lithgow, John Broadhead, J. Paul Reider, Marcia Scott, Timothy Graehl, Melissa Renee Rosenberg, Arthur Laughlin, John Jensen, Kim Valenza, David MacEwen, Linda McCain, Frances Lee Rowland, Oscar Perryman, John Bedford, H.E.D. Keyes, Irwin Bartram, Laurie Hayes, Debra S. Nelson, Gwen Millkie, Ron Rocco, Mary Palmer, Betsy Everhart, Rex Brouwer, Peter Adams, Willie Morgan, Robbi Gorney, Walt King, Adrienne Golden, Sally Anne Carroll, Ronn Crosby, Harry Lehman, Ari Parker, Ken L. Taylor, Jeannine Kobs, Dorothy Kirschenbauer, Karen Cale, David Stone, Danton Stone, Sharon Britt, Billy MacVittie, Bruce Butler, Paul Michael, Dennis Suchenec, Jenn Tymchyshyn, Mark Andersen, Dana Hohlfeld, Brian Brutsche, Mark Kimski, Rebecca Berezin, Tanya Brower, Elizabeth Harris, Michael Shulman, Constance Miles, Hope Anderson, Stanley Alexander, Erika

Bacon no : 1
Alexander, Erika is played with Bacon, Kevin in Movie :He Said, She Said (1991)
Menu

1. Bacon number
2. Distance btw two actors
3. Exit
```

Erika Alexander

## 1. İki Aktör Arası Uzaklık Bulma

### Örnek 1:

## Vincent Price – Winona Ryder

### Örnek 2:

Duffy, Mary Pat Piano, Rex Dale, Debbie McKenna, Maria Kramer, Harlan Beck, Bill Davis, Silas Adams, Matthew Thomasae, Susan P. Grodin, Sylvia Sato, Ed Braun, Rick Marineau, Barbara Vitale, Thomas Macgregor Brancato, Mike O'Leary, Tom Kaufman, Stanley Esposito, Ellen May Cala, Anthony Chong, Robbi Norum, John Reed, Penelope Van Santen, Patricia Dokken, Don Kirkland, Terence Shorty, Guitar Murray, Paul T. Sneed, Floyd Monroe, Paul Hansen, Lisa M. Murray, Paul Ferrara, Peter Howard, K. Theodore Taylor, Bobby Chong, Paris Kestenbaum, Benjamin Hart, Nina Busman, Gail Hausman, Jack Heacock, Linnea Del Rae, Barry Berle, Frank Klugman, Caren Freeman, Sari Schneiderman, Meryl Chafitz, Susan Gyory, Anna Beckett, Kay Robbins, Debbie Geffen, Madeline Turner, Ike Mitchell, Mary Freeman, Jamie Kotkin, Carrie Gittler, David Heriza, Catherine Rosenberg, Janie Scheideler, Michelle Halpert, Lillian Bedrick, Jane Rubin, Jinx Ferland, Nancy Dryden, Robert Harvey, Tony Cristobal, Corinna Lubin, Shellen Ayala, Mayra Sipes, Michelle D. Mistak, Danielle Ben-Eliezer, Hagar Hesse, Katrin Gorman, Jonathan LaVette, Maureen Suilen, Rebecca Stewart, Trisha Wittenbrock, Diana Russell, Lynette Herbst, Pam Greensmith, Jennie Dali, Tracy Stith, Babette Conkle, Lisa DePalma, Karynmarie Wolf, Lorna Silverberg, Marc Askew, Denise C. Morgan, Kathryn A. Bennett, Jackie Lubman, Melodee Trenkle, Jeni Halfmann, Melissa Varada, Janelle Peterson, Jamie Cusimano, Andrea Fleming, Casey Cherry, Stella Dempsey, Christopher Klempner, Esther Babakan, Rajnish Concienne, Michelle Marsh, Tamara Ward, Burt Harkey, Christina Esponda, Spridle Posner, Tracy McGuinness, Catherine Martin, W.T. Black, Edward Parra, Rose Jiroyan, Arsxne Delehanty, Thomas Husson, Hervé Fahrner, James Gautier, Christophe Gregg, David Wong, Cary Lewis, Junior John Busch, Adam Ragland, Anthony Bernard, Luc Schenmetzler, Daniel Almeida, Junior Challier, Eric Rashid, Mohammed Limo, Johnny Bullock, Keith S. Hernandez, Rocky Walace, Trevor Bateman, Geoffrey Kleber, Gilles One Blood, Willie Blake, Crystal Michelle Gonnello, Steve Andrúoni, Marc Glascoe, Keith A. Melissinos, James Legros, Didier Rolly, Ami mul Wehrhahn, Michael Montanary, Michel Fischer, Fred Mauro, Thierry Vizard, Peter Sharif, Abdul Hassan Malerba, Joseph Walker, Seth Jerome Regen, Elizabeth Naceri, Samy Dezen, Alex Peled, Danny Wyatt, Lucius 'Cherokee' McBride, Jeff Venteresa, Ed De Matt, Matt Justinius, Peter Saurave, Tony Srichoom, Chalvay Tsing, Elizabeth Virgo, Ian Bloom, Orlando Graph Level(Bacon no) : 2 Bloom, Orlando is played with Sporleder, Gregory in Movie :Black Hawk Down (2001) Sporleder, Gregory is played with Hanks, Tom in Movie :League of Their Own, A (1992) Menu

## Orlando Bloom – Tom Hanks

### Örnek 3:

```
Enter first Actor
Watson, Emma
Enter second Actor
Radcliffe, Daniel
Actor found
Actor found
Watson, Emma Grint, Rupert Radcliffe, Daniel
Graph Level(Bacon no) : 1
Radcliffe, Daniel is played with Watson, Emma in Movie :Harry Potter and the Prisoner of Azkaban (2004)
Menu
```

## Emma Watson – Daniel Radcliffe

*Örnek 4:*

```
Graph Level(Bacon no) : 1
Brando, Marlon is played with Cazale, John in Movie :Godfather Trilogy: 1901-1980, The (1992)
Menu

1. Bacon number
2. Distance btw two actors
3. Exit
```

John Cazale – Marlon Brando

*Örnek 5:*

```
Graph Level(Bacon no) : 1
Pacino, Al is played with Brando, Marlon in Movie :Godfather Trilogy: 1901-1980, The (1992)
Menu

1. Bacon number
2. Distance btw two actors
3. Exit
```

Al Pacino – Marlon Brando

*Örnek 6:*

```
Graph Level(Bacon no) : 2
Campbell, William is played with Brown, Jim in Movie :Black Gunn (1972)
Brown, Jim is played with Kennedy, George in Movie :...tick...tick... (1970)
Menu
```

William Campbell – George Kennedy

*Örnek 7:*

```
Graph Level(Bacon no) : 2
Lee, Christopher is played with Lerner, Michael in Movie :Tale of the Mummy (1998)
Lerner, Michael is played with Jackson, Samuel L. in Movie :Amos & Andrew (1993)
Menu

1. Bacon number
2. Distance btw two actors
3. Exit
```

Christopher Lee – Samuel L. Jackson

*Örnek 8:*

```
Graph Level(Bacon no) : 2
Murphy, Eddie is played with Myers, Mike in Movie :Shrek (2001)
Myers, Mike is played with Freeman, Morgan in Movie :54 (1998)
Menu

1. Bacon number
2. Distance btw two actors
3. Exit
```

Eddie Murphy – Morgan Freeman

*Örnek 9:*

```
Graph Level(Bacon no) : 2
Hudson, Ernie is played with Anderson, Ernest in Movie :Last of the Good Guys (1978)
Anderson, Ernest is played with Kennedy, George in Movie :...tick...tick...tick... (1970)
Menu

1. Bacon number
2. Distance btw two actors
3. Exit
```

Ernie Hudson – George Kennedy

*Örnek 10:*

```
Graph Level(Bacon no) : 2
Lee, Christopher is played with Thorn, Barbara in Movie :Terror of the Tongs, The (1961)
Thorn, Barbara is played with Hopkins, Anthony in Movie :84 Charing Cross Road (1986)
Menu

1. Bacon number
2. Distance btw two actors
3. Exit
```

Christopher Lee – Anthony Hopkins

## Kaynak Kodu

```
#include <stdlib.h>
#include <stdio.h>
#include <string.h>
#include <stdbool.h>

#define SIZE 341813 //Aktorlerin tutuldugu hash tablosu uzunlugu
#define MAXLEN 255 //Kelimelerin uzunlugu
#define MAXBUFFER 10000 //Dosya okuma buffer boyutu
#define DELIMITER '/' //Dosya okuma belirteci
#define MAXACTORS 170600 //Maksimum aktor sayisi

//BFS icin kullanilacak durum belirtecleri
#define initial 1
#define waiting 2
#define visited 3

char buffer[MAXBUFFER + 1];//Dosya okuma isleminde kullanilacak buffer

//Aktorleri tutan struct. Her bir aktor icin,
//Name: isim, ekranaya yazdirmada kullanilir
//Key: ismin hashlenmesi hali tekrar hesaplanmamak icin kullanilir
//hashIndex hash tablosunda tutuldugu indis. Program icerisinde aktor aramada kullanilir. Bulunan aktorun
//indisine gore komsuluk matrisi kurulacaktir
//ParentActor - Movie; BFS yaparken backtrack islemi icin kullanilir
//Bacon Kevin bacon icin bacon sayisi, diger arama icin agac seviyesi tutulur. BFS yapilirken ilklendirilip
//doldurulur.
struct Actor
{
    char name[MAXLEN];
    int key;
    int hashIndex;
    char parentMovie[MAXLEN];
    char parentActor[MAXLEN];
    int bacon;
};

//BFS algoritmasi icin global queue veri yapisi ilklendirilmesi
int queue[SIZE], front = -1, rear = -1;
int state[SIZE];//her bir aktorun graf icerisinde ziyaret edildigini bilgisini taşıyan dizi
int movieState[SIZE];//her bir filmin ziyaret edildigini bilgisini tutan dizi
void insert_queue(int);//Queue veri yapisina veri ekleyen fonksiyon
int delete_queue();//Queue veri yapisinden FIFO mantigiyla veri cikartan fonksiyon. Output olarak
kuyruktaki ilk elemani verir ve kuyruktan siler
int isEmpty_queue();//Kuyruğun bos olup olmadığını kontrol eden fonksiyon
struct Actor* hashTable[SIZE];//Aktorlerin tutuldugu hash table. Boyutu, toplam beklenen aktor sayisi *2
den buyuk en buyuk asal sayı olarak secildi
struct Actor* theActor;//arama islemlerinde geçici eleman tutmamiza yarayan degiskene
/*
    READFILE
    Dosya okuma islemi yapar ve komsuluk matrisini doldurur. Ardından menüyü baslatan fonksiyonu cagirir.
    @param1 char* : Okunacak dosya ismi
    @param2 int**: 2 boyutlu komsuluk matrisinin baslangic adresi
    @param3 char**: Film listesinin tutuldugu dizi
*/
void readFile(char* , int** , char** );

/*
    Addtomovies
    Verilen电影, movies dizisine atar ve bunu dinamik hafiza ile yapar
    @param1 char* listeye eklenecek filmin pointeri
    @param2 char** film listesinin pointeri
    @param3 int simdiye kadar sayilan film sayisi. Dinamik hafizanın (re)allocate edilmesinde kullanilir
*/
char** addToMovies(char* , char** , int );

/*
    Start
    Dosyalar okunup komsuluk matrisine eklendikten sonra, cagirilir. Sonsuz bir dongu icerisinde menüyü
ekrana basar ve
    kullanici girisine gore bacon veya iki aktor arasi mesefeyi bulur
    @param1 int** komsuluk matrisi, her satir birer film her sutun birer aktor olaak sekilde bi partite
graf
    @param2 char** : filmelerin tutuldugu dizi
    @param3 int : toplam film sayisi
    @param4 int : unique aktor sayisi
*/
void start(int** , char** , int , int );

/*
    Bacon
    BFS islemleri icin ilklendirme yapar. Iceride butun nodelarin durumu 0 ve butun queue bosaltılır. Ayrca
struct icinde bacon sayisi kalmissa onlar Olanir
    @param1 int** : komsuluk matrisi
    @param2 char** : filmelerin tutuldugu liste
    @param3 int : film sayisi
    @param4 int : Unique aktor sayisi
*/
```

```

@param5 - @param6 char * , baslangic ve bitis aktor isimleri
*/
void bacon(int** , char** , int , int , char* , char* );
/*
    Bfs
    Bfs islemleri icin gerekli veriler sifirlandiktan sonra, graf dolasma islemini yapar.
    @param1 : komsuluk matrisi
    @param2 char** : film listesi
    @param3 int: film sayisi
    @param4 int: baslangic dugumunun indis
    @param5 int: bitis dugumunun indis
*/
void bfs(int** , char** , int , int , int );
/*
    getkey
    verilen stringi hashler ve geriye output olarak hashlenmis sayi degerini verir
    @param1 char* : hashlenecek string
*/
unsigned long getKey(char* );
/*
    insert
    hash listesine verilen keye gore eleman ekler.
    @param1 unsigned long : key
    @param2 char* : veri, bu senaryoda oyuncunun ismi
*/
int insert(unsigned long , char* );
/*
    verilen key degerine gore hash tablosundan aktor bulur
    @param1 : key
*/
struct Actor* search(unsigned long );
//hashcode = hashlenmis degerin tablo uzunlugune gore modu
int hashCode(unsigned long key);

int main()
{
    char* input = "input-mpaa.txt";
    char** movies = NULL;
    int** adjMatrix = NULL;
    readFile(input, adjMatrix, movies);
    return 0;
}

```

```

void readFile(char* input, int** adjMatrix, char** movies)
{
    char *p, *actor, *movie; //p dosya okuma islemelerinde kullanilir
    FILE* file;
    int len;//satir boyunu tutmak icin kullanilir
    int position;//hash tablosuna eklenecek aktorun veya bulunan aktorun pozisyonunu tutar
    int numberOfMovies = 0;
    int numberOfActors = 0;
    int i, j = 0;
    // Dosyalarini okumak icin ac
    file = fopen(input, "r");
    if (file == NULL)
    {
        fprintf(stderr, "Error opening %s\n", input);
        exit(EXIT_FAILURE);
    }

    while (fgets(buffer, sizeof(buffer), file) != NULL)
    {
        //satir satir oku, satir sonunda varsa /n karakterini sil
        len = strlen(buffer);
        buffer[len - 1] = DELIMITER;
        //Windows dosya okuma sorunu icin
        if (len > 1 && buffer[len - 2] == '\r')
        {
            buffer[len - 2] = DELIMITER;
            buffer[len - 1] = '\0';
        }
        //her satir film ismi ile baslar
        p = movie = buffer;
        p = strchr(p, DELIMITER); // pointeri filmin isminden sonraya tasi
        *p++ = '\0';//null karakteri ile degistir ve pointeri ilerlet
        numberOfMovies++; //film okundu sayisini arttir
        movies = addToMovies(movie, movies, numberOfMovies); //filmi listeye ekle
        adjMatrix = realloc(adjMatrix, sizeof *adjMatrix * numberOfMovies); //Her film icin yeni bir satir
        olustur
        adjMatrix[numberOfMovies - 1] = calloc(SIZE, sizeof(int)); //Her satira yeteri kadar genislikte
        memory ata
        // Aktorleri oku
        actor = p;
        while ((p = strchr(p, DELIMITER)) != NULL)
        {
            //her \ isareti gordukten sonra null karakter koy
            *p++ = '\0';
            theActor = search(getKey(actor)); //aktoru isme gore ara
            if (theActor != NULL) //eger varsa
            {
                position = theActor->hashIndex; //aktorun film ile baglantisini kurmak icin indisini al
            }
            else //eger yoksa
            {
                numberOfActors++; // hash table eklemek icin unique aktor sayisini arttir
                position = insert(getKey(actor), actor); //aktoru hash tablosuna ekle
            }
            adjMatrix[numberOfMovies - 1][position] = 1; //aktor ve filmi iliskisini komsuluk matrisinde
            belirt
            actor = p; //bir sonkari aktor icin devam et
        }
        putchar('\n');
        printf("Movies : %d Actors : %d\n", numberOfMovies, numberOfActors);
        //getchar();
    }

    //butun aktorler ve filmler okunup komsuluk matrisine atildiktan sonra;
    start(adjMatrix, movies, numberOfMovies, numberOfActors);
    return adjMatrix;
}

```

```

void start(int** matrix, char** movies, int numberOfMovies, int numberOfActors)
{
    int choice;//kullanici secimi
    int i;
    char startWord[256];
    char stopWord[256];
    // pm(matrix,numberOfMovies,numberOfActors);
    do
    {
        printf("Menu\n\n");
        printf("1. Bacon number\n");
        printf("2. Distance btw two actors\n");
        printf("3. Exit\n");
        scanf("%d", &choice);

        switch (choice)
        {
            case 1:
                printf("Enter actor name for bacon search\n");
                gets(stopWord);//ilk anlamsiz karakterden kurtulmak icin oku
                gets(stopWord);//burada baslangic kevin bacon oldugu icin hardcoded yazilmistir
                bacon(matrix, movies, numberOfMovies, numberOfActors, "Bacon", Kevin", stopWord);
                break;
            case 2:
                printf("Enter first Actor\n");
                gets(startWord);//ilk anlamsiz karakterden kurtulmak icin oku
                gets(startWord);
                printf("Enter second Actor\n");
                gets(stopWord);//ikinci aktoru oku
                bacon(matrix, movies, numberOfMovies, numberOfActors, startWord, stopWord);
                break;
            case 3:
                printf("Bye\n");
                freeMemory(movies,numberOfMovies,matrix);//memoryi serbest brak
                break;
            default:
                printf("Invalid choice!\n");
                break;
        }
    } while (choice != 3);
}

void bacon(
    int** matrix, char** movies, int numberOfMovies, int numberOfActors, char* start, char* stop)
{
    int v;//baslangic indisini icin
    int p;//bitis indisini icin
    front = -1;//queue sifirlandi
    rear = -1;

    for (v = 0; v < SIZE; v++) //grafta kullanicin butun durum ve queue sifirlandi
    {
        state[v] = initial;
        movieState[v] = initial;
        queue[v] = 0;
    }
    theActor = search(getKey(start));//ilk inputu ara
    if (theActor != NULL)
    {
        printf("Actor found\n");
        v = theActor->hashIndex;//eger bulduysam indexini starta ata
    }
    else
    {
        printf("Actor not found : %s", start); //Bulamadiysam debug icin ismini ve hash degerini yaz
        printf("%d", getKey(start));
        return;
    }
    theActor = search(getKey(stop)); //ikinci inputu ara ve ayni islemleri tekrarla
    if (theActor != NULL)
    {
        printf("Actor found\n");
        p = theActor->hashIndex;
    }
    else
    {
        printf("Actor not found : %s", stop);
        printf("%d", getKey(stop));
        return;
    }

    bfs(matrix, movies, numberOfMovies, v, p); //grafi gezmeye basla
}

```

```

void bfs(int** matrix, char** movies, int numberOfMovies, int v, int p)
{
    int i, j, k;//gecici indis tutmak icin degerler
    int init = v;//baslangic dugumu

    hashTable[v]->bacon = 0;//baslangic dugumunun seviyesi Olanir
    insert_queue(v);//kuyruga eklenir
    state[v] = waiting;//durumu bekleniyor olarak degistirilir
    int stop = p; // bitis dugumu atanir
    int baconNo = 0;//toplamlam seviyeyi tutan degisken
    while (!isEmpty_queue())//kuyruk bos olmadigi surece
    {
        v = delete_queue(); //kuyruktaki ilk elemani al
        printf("%s ", hashTable[v]->name); //ekrana yaz
        if (hashTable[v]->bacon >= 6)//eger 6. seviye ise bacon iliskisi yoktur
        {
            printf("Graph exceeds six");//debug icin ekrana bilgi ver
            return;
        }
        state[v] = visited;//o node durumunu ziyaret edildi olarak isaretle
        if (v == stop)//eger aradigimiz deger ise ekrana bilgi ver
        {
            printf("\nGraph Level(Bacon no) : %d\n", hashTable[v]->bacon);
            while (v != init)//her bir parentActor icin backtrace yaparak baslangic noktasina kadar bilgi
ver
            {
                printf("%s is played with %s in Movie :%s\n", hashTable[v]->name,
                       hashTable[v]->parentActor, hashTable[v]->parentMovie);
                theActor = search(getKey(hashTable[v]->parentActor));
                v = theActor->hashIndex;
            }
            return;
        }

        //Arama baslangici
        for (i = 0; i < numberOfMovies; i++)// her bir film icin
        {
            if (matrix[i][v] == 1 && movieState[i] == initial)//eger aktor o filmde oynamis ise ve o filmin
            elemanlari daha once kuyruga eklenmemisse
            {
                for (j = 0; j < SIZE; j++)//o filmdeki her bir oyuncu icin
                {
                    if (matrix[i][j] == 1 && state[j] == initial)//eger birlikte oynandiysa ve daha once
                    kuyruga eklenmediyse
                    {
                        insert_queue(j); //oyuncuyu kuyruga ekle
                        strcpy(hashTable[j]->parentMovie, movies[i]); //parent olarak loopların icine
girerken kullanilan aktoru ve filmi yaz
                        strcpy(hashTable[j]->parentActor, hashTable[v]->name);
                        hashTable[j]->bacon = hashTable[v]->bacon + 1;//bacon seviyesini bir arttir. Bacon
seviyesi bir onceki aktorun bir fazlasi olarak arttilirilir
                        state[j] = waiting;//durumunu kuyruga atilmis olarak isaretle
                    }
                }
                movieState[i] = visited;//filmi ziyaret edildi olarak isaretle
            }
        }
    } //bu islemleri kuyruk bitene kadar surdur
}
void insert_queue(int vertex)
{
    if (rear == SIZE - 1)
        printf("Queue Overflow\n");
    else
    {
        if (front == -1)
            front = 0;
        rear = rear + 1;
        queue[rear] = vertex;
    }
}

int isEmpty_queue()
{
    if (front == -1 || front > rear)
        return 1;
    else
        return 0;
}

```

```

int delete_queue()
{
    int delete_item;
    if (front == -1 || front > rear)
    {
        printf("Queue Underflow\n");
        exit(1);
    }

    delete_item = queue[front];
    front = front + 1;
    return delete_item;
}
void freeMemory(char** movies, int numberOfMovies, int** adjMatrix)
{
    int i;
    for (i = 0; i < numberOfMovies; i++)
    {
        free(movies[i]);
        free(adjMatrix[i]);
    }
    free(movies);
    free(adjMatrix);
}

char** addToMovies(char* movie, char** movies, int numberOfMovies)
{
    movies = realloc(movies, sizeof(*movies) * numberOfMovies);
    movies[numberOfMovies - 1] = malloc(255);
    strcpy(movies[numberOfMovies - 1], movie);
    return movies;
}

int hashCode(unsigned long key)
{
    return key % SIZE;
}
struct Actor* search(unsigned long key)
{
    //hash degerinin modunu alarak indexi bul
    int hashIndex = hashCode(key);

    //dizide aktoru keyini bulana kadar
    while (hashTable[hashIndex] != NULL)
    {
        if (hashTable[hashIndex]->key == key)
        {
            return hashTable[hashIndex];
        }

        ++hashIndex;
        //Tabloyu son elemanlardan basa dogru don
        hashIndex %= SIZE;
    }

    return NULL;
}

int insert(unsigned long key, char* data)
{
    struct Actor* item = (struct Actor*)malloc(sizeof(struct Actor));
    strcpy(item->name, data);
    item->key = key;
    int hashIndex = hashCode(key);
    while (hashTable[hashIndex] != NULL)
    {
        ++hashIndex;
        hashIndex %= SIZE;
    }
    item->hashIndex = hashIndex;
    hashTable[hashIndex] = item;
    return hashIndex;
}
unsigned long getKey(char* str)
{
    unsigned long i, key;
    key = 0;
    i = 0;
    for (i = 0; i < strlen(str); i++)
    {
        key += round(str[i] * pow(3, strlen(str) - i - 1));
    }
    return key;
}

```