# Министерство образования и науки Российской Федерации

## Федеральное государственное бюджетное образовательное учреждение высшего образования

## «Новосибирский государственный технический университет»

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## Кафедра прикладной математики

### Лабораторная работа № 3 по дисциплине «Введение в искусственный интеллект и логическое программирование»

**Внутренняя база данных Турбо-Пролога**

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| Группа: | ПМ-63 |  |  |
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***Цель работы***

Понять принципы создания, управления и использования внутрен­них баз данных в Турбо-Прологе, научиться использовать их при про­ектировании программ.

***Задание №1***

а) напишите на Турбо-Прологе программу (используя внутреннюю базу данных), позволяющую спрашивать у пользователя, каким языком он владеет, и записывать ответы в базу данных.

б) в базу данных включите факты: ЯЗЫК(...), ВЛАДЕЕТ( \_ , \_ );

в) измените программу, включив в нее предикаты чтения базы данных из файла и записи в файл по окончании сеанса работы.

**Текст программы**

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| database  language(symbol)  know(symbol,symbol)  predicates  nondeterm choice(integer)  menu  nondeterm repeat  clauses  language(russian).  language(english).  language(japanese).  choice('1'):-  write("What is your name?\n"),  readln(Name),  language(Lang),  write("Do you know ",Lang,"?\n"),  readln(Answer),  Answer="yes",  assert(know(Name,Lang)),  fail.  choice('2'):-  write("What is the new language?\n"),  readln(Line),  assert(language(Line)).  choice('3'):-  write("Polyglots:\n"),  know(Name,Lang),  write(Name," knows ",Lang),nl.  choice('4'):-  write("Languages:\n"),  language(Lang),  write(Lang),nl.  choice('s'):-  write("Input file name of database\n"),  save("D:\base"),  write("Information saved successfully\n").  choice('l'):-  existfile("D:\base"),!,  consult("D:\base"),  write("Information loaded successfully\n");  write("No such file or wrong path!!\n").  choice('0'):- !.    menu :-  repeat,  write("------------------------------------\n"),  write("Make your choice:\n"),  write("1 - add information about you\n"),  write("2 - add language to database\n"),  write("3 - show all people\n"),  write("4 - show all known languages\n"),  write("s - save database in file\n"),  write("l - load database from file\n"),  write("0 - exit\n"),  readchar(Choice),  choice(Choice),  Choice='0',  !.  repeat.  repeat:- repeat.  goal  menu. |

* ***Результаты***

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| ***/\*Начало\*/***  *------------------------------------*  *Make your choice:*  *1 - add information about you*  *2 - add language to database*  *3 - show all people*  *4 - show all known languages*  *s - save database in file*  *l - load database from file*  *0 - exit*  *What is your name?*  *Sasha*  *Do you know russian?*  *yes*  *Do you know english?*  *yes*  *Do you know japanese?*  *no*  *------------------------------------*  *Make your choice:*  *1 - add information about you*  *2 - add language to database*  *3 - show all people*  *4 - show all known languages*  *s - save database in file*  *l - load database from file*  *0 - exit*  *What is the new language?*  *jewish*  *------------------------------------*  *Make your choice:*  *1 - add information about you*  *2 - add language to database*  *3 - show all people*  *4 - show all known languages*  *s - save database in file*  *l - load database from file*  *0 - exit*  *What is your name?*  *Max*  *Do you know russian?*  *no*  *Do you know english?*  *no*  *Do you know japanese?*  *yes*  *Do you know jewish?*  *yes* | ***/\*Конец\*/***  *Make your choice:*  *1 - add information about you*  *2 - add language to database*  *3 - show all people*  *4 - show all known languages*  *s - save database in file*  *l - load database from file*  *0 - exit*  *Polyglots:*  *Sasha knows russian*  *Sasha knows english*  *Max knows japanese*  *Max knows jewish*  *------------------------------------*  *Make your choice:*  *1 - add information about you*  *2 - add language to database*  *3 - show all people*  *4 - show all known languages*  *s - save database in file*  *l - load database from file*  *0 - exit*  *Languages:*  *russian*  *english*  *japanese*  *jewish*  *------------------------------------*  *Make your choice:*  *1 - add information about you*  *2 - add language to database*  *3 - show all people*  *4 - show all known languages*  *s - save database in file*  *l - load database from file*  *0 - exit*  *Information saved successfully* |

***Задание №2***

Измените свое индивидуальное задание из лабораторной рабо­ты № 2 таким образом, чтобы все основные факты вашей программы хра­нились во внутренней базе данных (считывались из файла, обрабатывались программой и снова записывались в файл). При этом введите диалог с поль­зователем для добавления или удаления фактов в базу данных (за основу организации диалога возьмите предыдущее задание 1).

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| domains  i = integer  list = i\*  database  toy\_name(symbol)  toy(symbol,integer,integer,integer)  price(integer)  minage(integer)  maxage(integer)  predicates  nondeterm choice(integer)  menu  nondeterm repeat  nondeterm task1(symbol,integer,integer)  nondeterm task2(symbol,integer,integer)  nondeterm task3(integer)  nondeterm task4(symbol,symbol,integer)  nondeterm task5(symbol)  nondeterm max(list,integer)  clauses  choice('1'):-  write("Enter price: "),  readint(Price),  write("Enter minimum age: "),  readint(MinAge),  task1(\_,Price,MinAge).  choice('2'):-  write("Enter minimum age: "),  readint(ReqMinAge),  write("Enter maximum age: "),  readint(ReqMaxAge),  task2(\_,ReqMinAge,ReqMaxAge).  choice('3'):-  task3(\_).  choice('4'):-  write("Enter name: "),  readln(ReqName),  write("Enter price: "),  readint(ReqPrice),  task4(\_,ReqName,ReqPrice).  choice('5'):-  task5(\_).  choice('6'):-  write("Name of adding toy: "),  readln(Name),  write("Price: "),  readint(Price),  write("Minimum age: "),  readint(MinAge),  write("Maximum age: "),  readint(MaxAge),  assert(toy(Name, Price, MinAge, MaxAge)),  fail.  choice('7'):-  write("The presence of toys in the database:\n"),  toy(Name,Price,MinAge,MaxAge),  write("Name : ",Name, "; Price : ",Price,"; Minimum age : ", MinAge,"; Maximum age : ",MaxAge),nl.  choice('s'):-  save("E:\base"),  write("Information saved successfully\n").  choice('l'):-  existfile("E:\base"),!,  consult("E:\base").  choice('0'):- !.  menu:-  repeat,  write("------------------------------------\n"),  write("Make your choice:\n"),  write("1 - task 1\n"),  write("2 - task 2\n"),  write("3 - task 3\n"),  write("4 - task 4\n"),  write("5 - task 5\n"),  write("6 - add information about toy\n"),  write("7 - show all toys\n"),  write("s - save database in file\n"),  write("l - load database from file\n"),  write("0 - exit\n"),  readchar(Choice),  choice(Choice),  Choice='0',  !.  repeat.  repeat :- repeat.    task1(Name,ReqPrice,ReqMinAge):-  toy(Name,Price,Minage,\_),  Price <= ReqPrice,  Minage <= ReqMinAge,  write(Name),nl.  task2(Name,ReqAge1,ReqAge2):-  toy(Name,\_,Minage,MaxAge),  ReqAge1 >= MinAge,  ReqAge2 <= MaxAge,  write(Name),nl.  task3(Price):-  toy(red\_blocks,Price1, \_, \_),  toy(blue\_blocks,Price2, \_, \_),  toy(pink\_blocks,Price3, \_, \_),  toy(yellow\_blocks,Price4, \_, \_),  Price=(Price1+Price2+Price3+Price4),  write(Price),nl.  task4(Name,ReqName, ReqPrice):-  findall(N,toy(ReqName,N,\_,\_),L),  L=[H|\_],  toy(Name,Price,\_,\_),  H+Price <= ReqPrice,  "ball"<>Name,  write(Name),nl.  task5(Name):-  findall(Price, toy(\_,Price,\_,\_), L),  max(L,Max),  toy(Name,Price,\_,\_),  abs(Max-Price) <= 1,  write(Name),nl.  max([Head|Tail],Result):-  max(Tail,Result), Result > Head,!.  max([Head|\_],Head).    goal  menu. |

* ***Результаты***

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| ------------------------------------  Make your choice:  1 - task 1  2 - task 2  3 - task 3  4 - task 4  5 - task 5  6 - add information about toy  7 - show all toys  s - save database in file  l - load database from file  0 - exit  ------------------------------------  Make your choice:  1 - task 1  2 - task 2  3 - task 3  4 - task 4  5 - task 5  6 - add information about toy  7 - show all toys  s - save database in file  l - load database from file  0 - exit  Name of adding toy: qq  Price: 9  Minimum age: 1  Miximum age: 2  ------------------------------------  Make your choice:  1 - task 1  2 - task 2  3 - task 3  4 - task 4  5 - task 5  6 - add information about toy  7 - show all toys  s - save database in file  l - load database from file  0 - exit  barbi  blue\_car  red\_car  oil  qq  ------------------------------------  Make your choice:  1 - task 1  2 - task 2  3 - task 3  4 - task 4  5 - task 5  6 - add information about toy  7 - show all toys  s - save database in file  l - load database from file  0 - exit  Enter name: ball  Enter price: 6  wooden\_doll  red\_blocks  blue\_blocks  pink\_blocks  linux  matches  lego  rabbit  test | ------------------------------------  Make your choice:  1 - task 1  2 - task 2  3 - task 3  4 - task 4  5 - task 5  6 - add information about toy  7 - show all toys  s - save database in file  l - load database from file  0 - exit  The presence of toys in the database:  Name : doll; Price : 7; Minimum age : 5; Maximum age : 10  Name : wooden\_doll; Price : 4; Minimum age : 2; Maximum age : 80  Name : red\_blocks; Price : 1; Minimum age : 3; Maximum age : 4  Name : blue\_blocks; Price : 2; Minimum age : 4; Maximum age : 5  Name : pink\_blocks; Price : 4; Minimum age : 3; Maximum age : 4  Name : yellow\_blocks; Price : 5; Minimum age : 3; Maximum age : 4  Name : linux; Price : 0; Minimum age : 17; Maximum age : 104  Name : matches; Price : 1; Minimum age : 18; Maximum age : 45  Name : tank; Price : 7; Minimum age : 4; Maximum age : 11  Name : barbi; Price : 10; Minimum age : 4; Maximum age : 8  Name : beer; Price : 5; Minimum age : 18; Maximum age : 60  Name : bear; Price : 6; Minimum age : 3; Maximum age : 5  Name : soft; Price : 8; Minimum age : 70; Maximum age : 200  Name : lego; Price : 4; Minimum age : 4; Maximum age : 12  Name : blue\_car; Price : 9; Minimum age : 3; Maximum age : 18  Name : red\_car; Price : 10; Minimum age : 18; Maximum age : 35  Name : rabbit; Price : 2; Minimum age : 2; Maximum age : 6  Name : test; Price : 4; Minimum age : 4; Maximum age : 17  Name : ball; Price : 2; Minimum age : 3; Maximum age : 15  Name : oil; Price : 10; Minimum age : 2; Maximum age : 3  Name : qq; Price : 9; Minimum age : 1; Maximum age : 2  ------------------------------------  Make your choice:  1 - task 1  2 - task 2  3 - task 3  4 - task 4  5 - task 5  6 - add information about toy  7 - show all toys  s - save database in file  l - load database from file  0 - exit  ------------------------------------  Make your choice:  1 - task 1  2 - task 2  3 - task 3  4 - task 4  5 - task 5  6 - add information about toy  7 - show all toys  s - save database in file  l - load database from file  0 - exit |