Chapter 5  System Design

5.1 Introduction

This part of the research puts forward a system design, which comes after the findings of the data analysis. Successful treatment of patients with various diseases of the prostate depends on the aggregation of the factors identified at the time of diagnosis with the right method of diagnosis. From the data collected, it is clearly shown which signs and symptoms make the most significant contribution to the process of diagnosis.

In the first stage, it is necessary to adhere to the recommendations of the International Conciliation Committee on Benign Prostatic Hyperplasia (BPH). Standard or normal patient is considered to be a man with symptoms of a violation of urination, putative the presence of infraversical obstruction.

5.2 Criteria for exclusion:

Successful treatment of patients with various diseases of the prostate depends on the aggregation of the factors identified at the time of diagnosis with the right method of diagnosis. To solve this problem, it is necessary to determine which signs and symptoms make the most significant contribution to the process of diagnosis. In the first stage, it is necessary to adhere to the recommendations of the International Conciliation Committee on Benign Prostatic Hyperplasia (BPH). The following list will be excluded from the diagnosis (Edmund, et al., 2007):

- Age less than 50 years
- Presence of prostate cancer
- Previous treatment for the obstruction caused by BPH not brought positive results
- Resistant to the therapy of diabetes mellitus, diabetic neuropathy
- Presence in an anamnesis or physical examination with signs of neurological disease
- Presence in an anamnesis of surgery or trauma in the pelvic
- Presence in an anamnesis of sexually transmitted diseases
- Taking drugs that can affect the bladder.

5.3 Age

Benign hyperplasia of the prostate is the most common benign neoplasm in the aging human male, has a high prevalence that increases progressively with age. According to the different authors data, by the age of 60, from 13 to 50 % of the men suffer from this disease, and by the age of 85, about 90 % of men, there are morphological changes typically for BPH. On average, half of these patients going on the macroscopic increase in cancer and in 25 % of patients develop clinical symptoms of prostate that require treatment. Development of benign prostatic hyperplasia known unlikely for young aged men (less than 40 years), as a rule, in this age disorders of urination associated with the presence of chronic prostatitis. At the same time, after 80 years the risk of developing prostate cancer increases (Roehrborn & McConnell, 2007).

5.4 Subjective complaints

In the practical urology, is common splitting up symptoms in two parts, symptoms of obstruction and symptoms of irritation. By splitting up symptoms in two parts are trying to emphasize not only the nature of the symptoms, but their differences on the severity (Ichiyanagi, et al., 2007).
Table 5.1: Symptoms of disorders of urination in the BPH (Ministry of Health, Malaysia Academy of Medicine of Malaysia, Malaysian Urological Association, 1998)

<table>
<thead>
<tr>
<th>Obstructive:</th>
<th>Irritative:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hesitancy - takes time to get stream started</td>
<td>Frequency</td>
</tr>
<tr>
<td>Poor Flow</td>
<td>Urgency</td>
</tr>
<tr>
<td>Intermittency – subject to interruption or periodic stopping</td>
<td>Urge Incontinence</td>
</tr>
<tr>
<td>Post Micturition Dribbling</td>
<td>Nocturia – need to urinate during the night</td>
</tr>
<tr>
<td>Straining</td>
<td>Dysuria – painful or difficult urination</td>
</tr>
<tr>
<td>Retention</td>
<td></td>
</tr>
<tr>
<td>Incomplete Emptying</td>
<td></td>
</tr>
<tr>
<td>Overflow Incontinence</td>
<td></td>
</tr>
</tbody>
</table>

In terms of prognostic obstructive symptoms are more dangerous, and surgical intervention is obviously important. Irritative symptoms, although significantly lower quality of life, less dangerous and can be eliminated with proper conservative treatment. In obstructive symptoms include difficulty in urination and stuttering urination, weak stream of urine, urinating on the drops, a feeling of incomplete bladder emptying, and incontinence with overflow. All obstructive symptoms show a violation of urinating, primarily due to an enlarged prostate, caused by an overgrowth of prostate cells. This enlargement constricts the urethra so the flow of urine is reduced, making it increasingly difficult to empty the bladder. The amount of urine left in the bladder was the main criterion for dividing BPH on the stages and indication for surgical treatment. It is also important that the same symptom, such as difficulty urinating or a feeling of incomplete
emptying of the bladder, patients interpreted very subjective and usually does not correspond to objective data.

However, it is clear that the allocation of obstructive symptoms and quantification of urine inside the bladder can serve as a basis for a preliminary view on the disease and its prognosis.

Irritative symptoms, among which first of all include urination, painful urination (dysuria), need to urinate during the night (nocturia), imperative feeling of urination, dribbling, and incontinence urine when the urge for urination, mostly it explained by changes in the BPH detrusor function and urethral sphincter.

However, as a rule, obstructive and irritative symptoms can be examined in the same patient in varying degrees, and there is no direct correlation between the severity of these manifestations and the severity of the state according to the objective examination (Ichiyanagi, et al., 2007).

5.5 Objective examination data

Rectally survey estimated the size, shape, symmetry, clarity of the prostate contour, consistency and uniformity of tissue cancer, patient's subjective feelings, and other parameters, the interpretation which the emphasis on differential diagnosis BPH, chronic prostatitis and prostate cancer. The size of the gland is determined by ellipsoid volume formula \( V_{np} = (d1 \times d2 \times d3) \times \pi / 6 \), whereas \( d1 \) – length; \( d2 \) – width; \( d3 \) – height (Rodriguez, et al., 2008). When identifying of high density areas, or stoned density is suspected prostate cancer. If there is pain with palpation, and the presence of dense texture, suggested the presence of chronic prostatitis.
5.6 Ultrasound

Addition in determining the size, shape and consistency of the prostate, ultrasound is currently the noninvasive and sufficiently accurate method in measuring urine inside the bladder.

With ultrasound it is very easy to identify stones inside the bladder, which may be an important issue in determination of the choices of treatment the patient. During a different diagnosis must take into account the ultrasound pathognomonic symptom BPH, chronic prostatitis and prostate cancer (University of Maryland Medical Center, 2008).

The availability of hyperechoic formation prostate gland may suspect the existence of chronic prostatitis. The availability of prostate hypoechoic sites may indicate the presence of prostate cancer.

In increase the size of the prostate with the presence of a homogeneous structure allows to make an assumption about the benign hyperplasia of the prostate. It should take into account the fact that usually there is a combination of all these changes in the prostate gland.

5.7 Uroflometry Data

The most frequent method to assess uroflometric curve is using the maximum urine flow rate (Qmax) and volume of urine (V comp). The value of Qmax, if more than 15 ml/sec is considered normal. With the value of Qmax from 15 to 10 ml/sec is considered reduced, possibly suggestive of outlet obstruction or a weak bladder. Flow rates between these values are more difficult to interpret. This is because there is a large
overlap of the distributions of Qmax for normal patients and patients with voiding abnormalities which limits the sensitivity and specificity that can be achieved with flow rate measurement alone. With a value from 10 to 5 ml/sec has expressed a violation, with values below 5 ml/sec - severe violations (Robert, 2007). In accordance with the recommendations of the 4th International Conciliation Committee on BPH maximum speed boundary of urination in men before 50 years is 15 ml/sec. This value may reduce to 2 ml/sec after 50 years consequently every 10 years, even in the absence of overt infraversical obstruction. In this paper were guided by these criteria when evaluating the results uroflometry. In selecting the optimal method of treatment for a particular patient, this paper focused on the extent of violations urodynamics: when the light level of violations, preference is given to conservative treatment and, when overt and severe violations, preference are given to operational treatments.

5.8 International Prostate Symptom Score (IPSS)

Scale of assessment symptoms classifies them by severity, divided into mild (0-7 points), moderate (8-19 points) and severe (20-35 points) (AUA Practice Guidelines Committee, 2003). This method is not an independent tool for the diagnosis BPH, because the symptoms, which include the issues, are not unique to this disease. International System of a total assessment of symptoms in diseases of the prostate was used in this paper in the primary examination in all patients, including patients with cystotomy drainage.

5.9 Analysis of blood for Prostate-Specific Antigen (PSA)

Normal rates of blood in the prostate-specific antigen (PSA) are the numbers 0 - 4 ng(nitroglycerin)/ml. In terms of 4 to 10 ng/ml (so-called “gray scale”) is mainly
expressed suspicion on the presence of prostate cancer. The more than 10 ng/ml in prostate-specific antigen, the presence of prostate cancer is very likely. Many doctors are now using the following ranges, with some variation (Thompson, et al., 2004):

- 0 to 2.5 ng/ml is low
- 2.6 to 10 ng/ml is slightly to moderately elevated
- 10 to 19.9 ng/ml is moderately elevated
- 20 ng/ml or more is significantly elevated

5.10 Computer-based assessment for diagnostics and development of recommendations for the treatment of the patients with different types of urinating violations

Every doctor and specialist is considering his/her own set of signs, besides some signs are common, some are most important in the diagnosis, but some specific. It should be noted that the use of computer diagnostics, doctor can increase the number of criteria, as there are practically no limits on complexity and number of searching options. However, the construction of an appropriate knowledge based model for the diagnosis is extremely complex, as in this case, the knowledge based model should associate and align with the experts’ knowledge. The knowledge based model will allow urologists and physicians to significantly increase the quality of diagnosis.

In construction knowledge based model the following options will be considered for peer review:

1. Passport data (age)
2. Subjective assessment of urination for estimation
   - micturition (painful urination)
   - frequent urge for urination during night
- frequent urge for urination during day
- strangury
- delay of urine in anamnesis
- stuttering urination
- feeling of incomplete bladder emptying
- blood in the urine hematuria
- absence of ability to keep urine
- urinary incontinence
- reduction of potency
- frequent nocturnal erection

3. International Prostate Symptom Score (IPSS) and Quality of Life (QoL)

4. The objective examination of the patient: including palpation of the kidneys, the organs of scrotum, digital rectal examination.

5. The instrumental examination of patients: including data from ultrasound of the prostate and bladder, data uroflometry.

6. The data from analysis of blood prostate-specific antigen.

There are several methods which can be implemented in constructing a model of the classification or diagnosis:

1. **Statistical and probabilistic (likelihood) methods.** In this case, with each criterion is associated with the weighting factor received by practical experience. Diagnosis in this case is reduced to the summation of the existence symptoms coefficients (Nazarenko, et al., 2005): the value reflects the degree of development of a diagnosis. More advanced systems use probabilistic methods based on Bayes' formula, however all systems of likelihood method has one drawback: the complexity and subjectivity of choosing the weighting factor, as
well as the need for a separate statistical survey and the participation of the expert group. In addition, each symptom is taken into account by itself, in isolation from others, and cannot take into account the peculiarities of presentation a few symptoms at the same time and their interaction.

2. Neural networks (Nazarenko, et al., 2005). In essence, this method resembles statistic, because it is based on mathematical calculations, and contains no explicit model of expert knowledge, but takes into account the complex interaction of symptoms. Computer model of the neural network is able to study specific examples, to accumulate experience in itself, and then successfully use to solve the same class of problems. The theory of neural networks is well developed, and the software is available easily. However, a significant shortcoming of this model is that it is necessary to have sufficiently large number of examples from already known results of diagnosis (for an estimate number of criteria from 15 to 200 examples for the satisfactory operation of the network), which in this case, it is difficult.

3. Methods for modeling a computer-based program in diagnosis and treatment. In this case, the program seems clear pattern of knowledge based system, which is then applied to a set of initial symptoms and modeling reasoning, comes to the diagnosis. Knowledge in such systems is often presented as a large number of rules of reasoning, making conclusions about the patient.

     For this knowledge based model will be constructed based on the rules of IF and ELSE. The advantages of this approach are:
     
     • Ability to build a model of reasoning based on available urologist’ and physicians’ knowledge, without statistical research. While this looks like
an advantage, in fact, the process of extracting knowledge from experts are extremely severe tasks.

- Comparative ease of updating of knowledge for improvement of model. Technically expansion and improvement of model is done by adding of new rules. However, when adding rules rises its own problems associated with the requirement of consistency and independence of the rules from other rules in the knowledge base.

- The obvious character of the model, which allows a developer to track the process of obtaining a diagnosis and to correct it if in case of need.

One of the main disadvantages of this approach is the difficulty of obtaining knowledge from the urologists and physicians, as well as maintaining the integrity and correct operation of the joint large number of rules, but for this task, this approach seems most appropriate.
5.11 Diagnostic process

Figure 5.1: The integrated scheme process of diagnostics of the patient with urination disorders:
1. At initial stage rough estimates about diagnosis can be done with the respect to age. Most likely at the age of 40 years submitted to the diagnosis of “chronic prostatitis”. Between the age from 40 to 80 years possible to assume presence of the patient with urination disorders of the prostate. And at the age more than 80 years more presumable diagnosis can be BPH and prostate cancer.

2. To develop the initial version of the program will use the decision tree method. The tree of solutions is a graphic representation of the process of reasoning by the physician-urologists in the diagnosis and recommendations.

Table 5.2: Interpretation of patient complaints.

<table>
<thead>
<tr>
<th>QUESTIONS</th>
<th>THE POSITIVE RESPONSE ALLOWS TO ASSUME</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Painful urination</td>
<td>CHRONIC PROSTATITIS</td>
</tr>
<tr>
<td>2. Frequent urge for urination during night</td>
<td>BPH</td>
</tr>
<tr>
<td>3. Frequent urge for urination during day</td>
<td>CHRONIC PROSTATITIS BPH or CANCER</td>
</tr>
<tr>
<td>4. Strangury</td>
<td>BPH</td>
</tr>
<tr>
<td>5. Delay of urine in an anamnesis</td>
<td>BPH</td>
</tr>
<tr>
<td>6. Stuttering urination</td>
<td>BPH</td>
</tr>
<tr>
<td>7. A feeling of incomplete bladder emptying</td>
<td>BPH</td>
</tr>
<tr>
<td>8. Blood in the urine hematuria</td>
<td>BPH</td>
</tr>
<tr>
<td>9. Absence of ability to keep urine</td>
<td>CHRONIC PROSTATITIS</td>
</tr>
<tr>
<td>10. Urinary incontinence</td>
<td>BPH</td>
</tr>
<tr>
<td>11. Reduction of potency</td>
<td>CHRONIC PROSTATITIS BPH</td>
</tr>
<tr>
<td>12. Frequent nocturnal erection and high libido</td>
<td>CANCER</td>
</tr>
</tbody>
</table>
Figure 5.2: The decision tree for the preliminary diagnosis.

Legend:
c1 = painful urination
c2 = frequent urge for urination during night
c3 = frequent urge for urination during day
c4 = strangury
c5 = delay of urine in an anamnesis
c6 = stuttering urination
c7 = feeling of incomplete emptying
c8 = blood in the urine hematuria
c9 = absence of ability to keep urine
c10 = urinary incontinence
c11 = reduction of potency
c12 = frequent nocturnal erection
Legend:

c1 = painful urination
c2 = frequent urge for urination during night
c3 = frequent urge for urination during day
c4 = strangury
c5 = delay of urine in an anamnesis
c6 = stuttering urination
c7 = feeling of incomplete emptying
c8 = blood in the urine hematuria
c9 = absence of ability to keep urine
c10 = urinary incontinence
c11 = reduction of potency
c12 = frequent nocturnal erection
Complaints of the patient at the primary collection of the anamnesis:

- c1 = painful urination
- c2 = frequent urge for urination during night
- c3 = frequent urge for urination during day
- c4 = strangury
- c5 = delay of urine in an anamnesis
- c6 = stuttering urination
- c7 = feeling of incomplete emptying
- c8 = blood in the urine hematuria
- c9 = absence of ability to keep urine
- c10 = urinary incontinence
- c11 = reduction of potency
- c12 = frequent nocturnal erection
3. For physical examination:

**Palpation of kidneys**
- kidneys are not palpated
- palpation of one or both
- palpatory tenderness

**Palpation of scrotum organs**
- scrotum organs are not altered
- presence of hydrocele
- presence of inflammatory alterations in the scrotum organs

With digital rectal examination the major characteristics were put in:

a) Dimensions of prostate gland
b) Consistence
c) Bounds of the gland
d) Palpatory tenderness
e) Presence of regions with petrosal density

When entering data one of the eight digital rectal examination variants should be selected:

i. Prostate gland is not altered;

ii. Prostate gland is not expanded, sickly and of dough-like consistency;

iii. Prostate gland is moderately expanded, sickly and of dough-like consistency;

iv. Prostate gland is moderately expanded, sickly and of elastic consistency;

v. Prostate gland is moderately expanded, painless with regions of high density;

vi. Prostate gland is considerably expanded, painless and of elastic consistency;
vii. Prostate gland is without exact boundaries, with thick consistency;
viii. Presence of thick regions regardless of dimensions and boundaries of prostate gland.

4. In conducting instrumental investigation:

Analysis of ultrasound examination data includes dimensions of prostate gland, clearness of its boundaries, presence of hyper and hypoechoic regions in parenchyma of the gland, and also the availability and volume of residual urine. The system provides ability to calculate the volume by entering dimensions prostate gland.

The user is given choice to select one of the most matching models for description of prostate gland parenchyma condition:

- Homogeneous
- Heterogeneous with areas of high echogenicity
- Heterogeneous with areas of low echogenicity

The analysis of urinoflowmetric data shows the maximum speed of urine flow. In case of insufficient volume of urination the user is informed about this. The manual input of information is provided.

Further the Figure 5.3 shows the diagnostic diagram which depends on data of digital rectal examination, ultrasound investigation data and data from urinoflowmetrics:
Figure 5.3: Diagnostic diagram based on examination data, ultrasound and urinoflowmetrics.

Legend:

1 = Prostate gland is not altered;
2 = Prostate gland is not expanded, sickly and of dough-like consistency;
3 = Prostate gland is moderately expanded, sickly and of dough-like consistency;
4 = Prostate gland is moderately expanded, painless and of elastic consistency;
5 = Prostate gland is moderately expanded, painless with regions of high density;
6 = Prostate gland is considerably expanded, painless and of elastic consistency;
7 = Prostate gland is without exact boundaries, with thick consistency;
8 = Presence of thick regions regardless of dimensions and boundaries of prostate gland.
Digital rectal investigation:

1. Prostate gland is not altered;
2. Prostate gland is not expanded, sickly and of dough-like consistency;
3. Prostate gland is moderately expanded, sickly and of dough-like consistency;
4. Prostate gland is moderately expanded, painless and of elastic consistency;
5. Prostate gland is moderately expanded, painless with regions of high density;
6. Prostate gland is considerably expanded, painless and of elastic consistency;
7. Prostate gland is without exact boundaries, with thick consistency;
8. Presence of thick regions regardless of dimensions and boundaries of prostate gland.

Parenchyma of prostate gland (from Ultrasound data):

1. Homogeneous
2. Heterogeneous with areas of high echogenicity
3. Heterogeneous with areas of low echogenicity

The size of prostate gland (from Ultrasound data):

1. Less than 30 cm$^3$
2. From 30 to 60 cm$^3$
3. More than 60 cm$^3$

If there is a suspicion of prostate cancer the following action algorithm is used (Thompson, et al., 2004):
Table 5.3: Action algorithm in case of prostate cancer.

<table>
<thead>
<tr>
<th>HEALTHY PATIENT</th>
<th>PATIENT WITH UROLOGICAL COMPLAINTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>DRI* + PSA**</td>
<td></td>
</tr>
<tr>
<td>DRI WITH SUSPICION FOR PROSTATE CANCER GIVEN ANY LEVEL OF PSA</td>
<td>DRI IS NORMAL + THE LEVEL OF TOTAL PSA EXCEEDS THE NORM</td>
</tr>
<tr>
<td>DETERMINATION OF FREE PSA</td>
<td></td>
</tr>
<tr>
<td>PROPORTION OF FREE TO TOTAL PSA IS LESS THAN 15%</td>
<td>PROPORTION OF FREE TO TOTAL PSA IS MORE THAN 15%</td>
</tr>
<tr>
<td>TRUSI*** + BIOPSY OF PROSTATE</td>
<td>REPEATED EXAMINATION AFTER 6 MONTHS</td>
</tr>
</tbody>
</table>

*DRI – Digital Rectal Investigation

** PSA- Prostate Specific Antigen

*** TRUSI – Transrectal Ultrasound Investigation
The International Prostate Symptom Score system (IPSS) is embedded into the program in the form of questions and answers (in convenient and usual for user table format). On the basis of complex investigation conducted the diagnosis is determined in adopted form S-L-Q-R-V (Table 5.4).

Table 5.4: Clinical status parameters of patient with Benign Hyperplasia of Prostate gland

<table>
<thead>
<tr>
<th>SIMPTOMS/ PARAMETERS</th>
<th>EVALUATION METHOD</th>
<th>DESIGNATION</th>
<th>EVALUATION UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symptoms</td>
<td>IPSS</td>
<td>S</td>
<td>Points 0-35</td>
</tr>
<tr>
<td>Quality of life</td>
<td>Question for evaluation</td>
<td>L</td>
<td>Points 0-6</td>
</tr>
<tr>
<td>Speed of flow</td>
<td>Q max</td>
<td>Q</td>
<td>Ml/s</td>
</tr>
<tr>
<td>Residual urine</td>
<td>Determination of the volume of residual urine</td>
<td>R</td>
<td>Ml</td>
</tr>
<tr>
<td>Size of prostate</td>
<td>Taking measurements</td>
<td>V</td>
<td>Ml (cm$^3$) or grammes</td>
</tr>
</tbody>
</table>

Example: **S18 L4 Q8 R150 V35** (see chapter 2.2.6)
Figure 5.4: Decision tree for one of the stages of accurate diagnosis definition and selection of treatment tactics.
Figure 5.5: Benign prostatic hyperplasia diagnosis and treatment algorithm

- **Initial Evaluation**
  - History
  - ORE & focused PE
  - Urinalysis
  - PSA

- **AUA/IPSS symptom index**
  - Assessment of patient bother

- **Moderate/severe symptoms (AUA/IPSS ≥ 8)**

- **Presence of**
  - Refractory retention or any of the following clearly related to BPH
  - Persistent gross hematuria
  - Bladder stones
  - Recurrent UTIs

- **Mild symptoms (AUA/IPSS ≤ 7) or No bother some symptoms**

- **Optional diagnostic tests**
  - Uroflow
  - PVR

- **Discussion of treatment options**

- **Patient chooses noninvasive therapy**
  - Watchful waiting

- **Patient chooses invasive therapy**
  - Optional diagnostic tests
    - Pressure flow
    - Urethrocystoscopy
    - Prostate ultrasound
  - Minimally invasive therapies
  - Surgery

- **Surgery**
5.12 Tools and Requirements for Computer Based Program

In this section the researcher introduces the tools and requirement used in the developing of computer based program. In this computer based program, Delphi programming language is used. Delphi is the Rapid Application Development (RAD) Visual development environment for software and database application developers who need to rapidly deliver high performance and easy to maintain software applications. Delphi is a programming language and software development environment. It is produced by Borland. The Delphi language, formerly known as the Object Pascal Language originally targeted only Microsoft Windows, but now builds native applications for Linux and the Microsoft.Net Framework. It was one of the first of what came to be known as RAD tools, for Rapid Application Development, when released in 1995. Delphi 2, released a year later, supported 32-bit Windows environment.

The remarkable features of the Delphi language includes (Arkhangelski, 2003):

- Rapid Application Development (RAD).
- Based on a well-designed language.
- A large community on Usenet and the web (e.g., news://forums.borland.com and Borland’s web access to Delphi newsgroups).
- Can compile to a single executable, simplifying distribution and reducing dll versioning issues.
- Many VCL and third-party components (usually available with full source code) and tools (documentation, debug tools, etc.).
- Quick optimizing compiler and ability to use assembler code.
- Multiple platform native code from the same source code.
- High level of source compatibility between versions.
CrossKylix – a third party toolkit which allows you to compile native Kylix/Lunix application from inside the Windows Delphi IDE, hence easily enabling dual-platform development and deployment.

CrossFPC – a sister project to CrossKylix, which enables you to cross-compile your Windows Delphi applications to multi-platform targets – supported by the Free Pascal compiler – without ever leaving the Delphi IDE.

Class helpers to bridge functionality available natively in the Delphi RTL, but not available in a new platform supported by Delphi.

The following are disadvantages:

- Partial single vendor lock-in (Borland alone can set the language standard, the compatibles have to follow).
- Limited cross-platform capability for Delphi itself. Compatibles provide more architecture/OS combinations.
- Access to platform and third party libraries require header files to be translated to Pascal.
- Documentation of platforms and techniques hard to find in Pascal language.

5.13 System Configuration Requirements

System configurations requirements for computer based program as follows:

- Operating System: any type of Windows
- Memory (RAM): at least (1) GB
- Hard disk: at least (40) GB
- Processor: 1.6 GHz. Centrino Core 2 Duo
5.14 Conclusion

Based on single diagnosis and studies on the data, is not possible to come out with good treatment plan. One must consider the entire syndrome, which includes all of the parameters such as patient complaints, the objective examination, the ultrasound data uroflometry and many other factors.

As it can be seen from examples shown earlier the process of diagnosis is done by system in several stages which comprise a single process. On each following stage of diagnosis the results of previous stages are taken into consideration. On the last stage of the process the user comes to a decision.

The choice of using Delphi 7 in programming Computer Based Program, because Delphi radically speeds desktop, workstation and web application development without sacrificing an ounce of programming power or control. Application built with Delphi is lightning fast, compact, provide rich UIs, and can connect with virtually any database or data source. With Delphi, can radically reduce development time and build Windows applications up to 5x faster than with other development solutions. Speed your way from prototype to production with visual drag-and-drop tools and powerful component library. Delphi is not an interpreted language, it compiles to machine code, making it exceptionally fast. Delphi’s string handling is particularly fast, which is important when developing a string-heavy application. Startup time is quite fast, because they do not have to wait for any runtime to load, this is a crucial benefit. Applications that take a long time to load have a low perceived performance, regardless of how fast they are once they are loaded. Finally Delphi consist dbExpress with support for 9 major databases.